



simatic ET200S

Frequency Converter ET 200S FC
Power Module IPM25
Control Unit ICU24 / ICU24F

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Frequency Converter ET 200S FC with Control Units ICU24 / ICU24F and Power Module IPM25

Parameter Manual
SW-Version 1.0

Important Notes

Parameter Descriptions 1

Function Diagrams 2

Faults and Alarms 3

Abbreviations

This documentation belongs
to the documentation packages:
6SL3298-0CA12-0BP0 and
6SL3298-0CA12-1BP0

This documentation is also
available on CD:
6SL3298-0CA11-1MG0

Issue 07/2005

Important Notes

This Parameter Manual has to be used together with the Operating Instructions of the Frequency Converter ET 200S FC.



Warning

Please refer to all Definitions and Warnings contained in the Operating Instructions for the Frequency Converter ET 200S FC. You will find it in the Internet under <http://support.automation.siemens.com/WW/view/en/12834637/133300> or on the CD-ROM Order No. 6SL3298-0CA11-1MG0.

Continuously updated information

Your local partner for communications-capable low-voltage switchgear in your region is available if you have any questions regarding the Frequency Converter ET 200S FC. A list of contact partners and the latest Edition of the Operating Instructions is provided in the Internet under:

<http://siemens.com/automation/partners>

Additional information sources are available under:

<http://support.automation.siemens.com/WW/view/en/10804985/133100>
<http://www4.ad.siemens.de/WW/view/en/18686824/133100>

Target group

This Parameter Manual describes the parameters of the Frequency Converter ET 200S FC and gives an functional overview via function diagrams. These Instructions address engineers, commissioning and machine operators as well as service and maintenance personnel.

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Exclusion of liability

Additional functions may be available that are not described in this document. However, this fact does not represent a responsibility to provide such functions with a new control or when providing service. We have checked the contents of this document with the described hardware and software.

However, deviations cannot be completely ruled-out so that we cannot guarantee complete conformance. However, the information in this document is regularly checked and the necessary corrections included in subsequent editions. We are thankful for any recommendations or suggestions.

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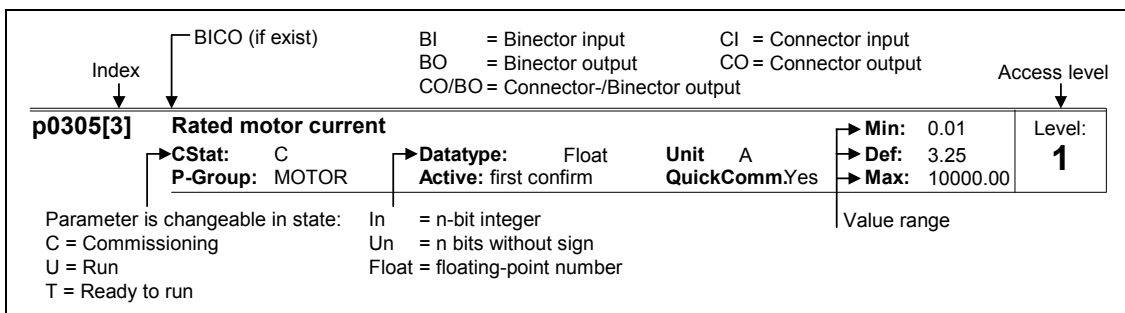
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Parameters

1.1 Listing the parameter attributes

A detailed function description is provided in the Chapter "Commissioning and Operation" of the Operating Instructions.

In the following graphic the attributes and attribute groups are shown as an example of p0305.



Note

Without a BOP (Basic Operator Panel), the field "Active" has no meaning.

1.2 Notation (examples)

Setting parameters

p0927	setting parameter 927
p1750.1	setting parameter 1750 bit 01
p0719[1]	setting parameter 719 index 1
p0013[20]	setting parameter 13 with 20 indices (indices 0 to 19)

Monitoring parameters

r0002	monitoring parameter 2
r0052.3	monitoring parameter 52 Bit 03
r0947[2]	monitoring parameter 947 Index 2
r0964[5]	monitoring parameter 964 with 5 indices (indices 0 to 4)

1.3 Quick commissioning (P0010 = 1)

The following parameters are necessary for quick commissioning (P0010 = 1).

Quick commissioning (P0010 = 1)

When P0010 = 1 is chosen, P0003 (user access level) can be used to select the parameters to be accessed (only if BOP available). This parameter also allows selection of a user-defined parameter list for quick commissioning.

At the end of the quick commissioning sequence, set P3900 = 1 to carry out the necessary motor calculations and clear all other parameters (not included in P0010 = 1) to their default settings.

Note

This applies only in Quick Commissioning mode.

P0100	Europe / North America
P0300	Select motor type
P0304	Rated motor voltage
P0305	Rated motor current
P0307	Rated motor power
P0308	Rated motor cosPhi
P0309	Rated motor efficiency
P0310	Rated motor frequency
P0311	Rated motor speed
P0314	Motor pole pair number
P0320	Motor magnetizing current
P0335	Motor cooling
P0500	Technological application
P0640	Motor overload factor [%]
P0700	Selection of command source
P1000	Selection of frequency setpoint
P1080	Min. frequency
P1082	Max. frequency
P1120	Ramp-up time
P1121	Ramp-down time
P1135	OFF3 ramp-down time
P1300	Control mode
P1500	Selection of torque setpoint
P1910	Select motor data identification
P1960	Speed control optimisation
P3900	End of quick commissioning

1.4 Command and Drive Datasets - Overview

Command Datasets (CDS)

P0700[3]	Selection of command source	P1113[3]	BI: Reverse
P0701[3]	Function of digital input 0	P1124[3]	BI: Enable JOG ramp times
P0702[3]	Function of digital input 1	P1140[3]	BI: RFG enable
P0719[3]	Selection of cmd. & freq. setp.	P1141[3]	BI: RFG start
P0731[3]	BI: Function of digital output 0	P1142[3]	BI: RFG enable setpoint
P0732[3]	BI: Function of digital output 1	P1330[3]	CI: Voltage setpoint
P0840[3]	BI: ON/OFF1	P1477[3]	BI: Set integrator of n-ctrl.
P0842[3]	BI: ON reverse/OFF1	P1478[3]	CI: Set integrator value n-ctrl.
P0844[3]	BI: 1. OFF2	P1492[3]	BI: Enable droop
P0845[3]	BI: 2. OFF2	P1500[3]	Selection of torque setpoint
P0848[3]	BI: 1. OFF3	P1501[3]	BI: Change to torque control
P0849[3]	BI: 2. OFF3	P1503[3]	CI: Torque setpoint
P0852[3]	BI: Pulse enable	P1511[3]	CI: Additional torque setpoint
P1000[3]	Selection of frequency setpoint	P1522[3]	CI: Upper torque limit
P1055[3]	BI: Enable JOG right	P1523[3]	CI: Lower torque limit
P1056[3]	BI: Enable JOG left	P2103[3]	BI: 1. Faults acknowledgement
P1070[3]	CI: Main setpoint	P2104[3]	BI: 2. Faults acknowledgement
P1071[3]	CI: Main setpoint scaling	P2106[3]	BI: External fault
P1074[3]	BI: Disable additional setpoint	P2151[3]	CI: Drehzahlsollwert für Meldung
P1075[3]	CI: Additional setpoint	P2152[3]	CI: Ist-Drehzahl für Meldung
P1076[3]	CI: Additional setpoint scaling		
P1110[3]	BI: Inhibit neg. freq. setpoint		

Drive Datasets (DDS)

r0035[3]	CO: Act. motor temperature	r0373[3]	Rated stator resistance [%]
P0291[3]	Inverter protection	r0374[3]	Rotor resistance [%]
P0300[3]	Select motor type	r0376[3]	Rated rotor resistance [%]
P0304[3]	Rated motor voltage	r0377[3]	Total leakage reactance [%]
P0305[3]	Rated motor current	r0382[3]	Main reactance [%]
P0307[3]	Rated motor power	r0384[3]	Rotor time constant
P0308[3]	Rated motor cosPhi	r0386[3]	Total leakage time constant
P0309[3]	Rated motor efficiency	P0400[3]	Select encoder type
P0310[3]	Rated motor frequency	P0405[3]	Enables selection of various pulse types
P0311[3]	Rated motor speed	P0408[3]	Encoder pulses per revolution
r0313[3]	Motor pole pairs	P0410[3]	Reverses internal direction sense.
P0314[3]	Motor pole pair number	P0491[3]	Reaction on speed signal loss
P0320[3]	Motor magnetizing current	P0492[3]	Allowed speed difference
r0330[3]	Rated motor slip	P0494[3]	Delay speed loss reaction
r0331[3]	Rated magnetization current	P0500[3]	Technological application
r0332[3]	Rated power factor	P0601[3]	Motor temperature sensor
r0333[3]	Rated motor torque	P0604[3]	Threshold motor temperature
P0335[3]	Motor cooling	P0625[3]	Ambient motor temperature
P0340[3]	Calculation of motor parameters	P0626[3]	Overtemperature stator iron
P0341[3]	Motor inertia [kg*m^2]	P0627[3]	Overtemperature stator winding
P0342[3]	Total/motor inertia ratio	P0628[3]	Overtemperature rotor winding
P0344[3]	Motor weight	r0630[3]	CO: Ambient temperature
r0345[3]	Motor start-up time	r0631[3]	CO: Stator iron temperature
P0346[3]	Magnetization time	r0632[3]	CO: Stator winding temperature
P0347[3]	Demagnetization time	r0633[3]	CO: Rotor winding temperature
P0350[3]	Stator resistance (line-to-line)	P0640[3]	Motor overload factor [%]
P0352[3]	Cable resistance	P1058[3]	JOG frequency
P0354[3]	Rotor resistance	P1059[3]	JOG frequency left
P0356[3]	Stator leakage inductance	P1060[3]	JOG ramp-up time
P0358[3]	Rotor leakage inductance	P1061[3]	JOG ramp-down time
P0360[3]	Main inductance	P1080[3]	Min. frequency
P0362[3]	Magnetizing curve flux 1	P1082[3]	Max. frequency
P0363[3]	Magnetizing curve flux 2	P1091[3]	Skip frequency
P0364[3]	Magnetizing curve flux 3	P1092[3]	Skip frequency 2
P0365[3]	Magnetizing curve flux 4	P1093[3]	Skip frequency 3
P0366[3]	Magnetizing curve imag 1	P1094[3]	Skip frequency 4
P0367[3]	Magnetizing curve imag 2	P1101[3]	Skip frequency bandwidth
P0368[3]	Magnetizing curve imag 3	P1120[3]	Ramp-up time
P0369[3]	Magnetizing curve imag 4	P1121[3]	Ramp-down time
r0370[3]	Stator resistance [%]	P1130[3]	Ramp-up initial rounding time
r0372[3]	Cable resistance [%]	P1131[3]	Ramp-up final rounding time

P1132[3]	Ramp-down initial rounding time	P1570[3]	CO: Fixed value flux setpoint
P1133[3]	Ramp-down final rounding time	P1574[3]	Dynamic voltage headroom
P1134[3]	Rounding type	P1580[3]	Efficiency optimization
P1135[3]	OFF3 ramp-down time	P1582[3]	Smooth time for flux setpoint
P1202[3]	Motor-current: Flying start	P1596[3]	Int. time field weak. controller
P1203[3]	Search rate: Flying start	P1610[3]	Continuous torque boost (SLVC)
P1253[3]	Vdc-controller or I-max regen controller output limitation	P1611[3]	Acc. torque boost (SLVC)
P1300[3]	Control mode	P1654[3]	Smooth time for Isq setpoint
P1310[3]	Continuous boost	P1715[3]	Gain current controller
P1311[3]	Acceleration boost	P1717[3]	Integral time current controller
P1312[3]	Starting boost	P1745[3]	Flux variance limit in stall
P1316[3]	Boost end frequency	P1750[3]	Control word of motor model
P1320[3]	Programmable V/f freq. coord. 1	P1755[3]	Start-freq. motor model (SLVC)
P1321[3]	Programmable V/f volt. coord. 1	P1756[3]	Hyst.-freq. motor model (SLVC)
P1322[3]	Programmable V/f freq. coord. 2	P1758[3]	T(wait) transit to feed-fwd-mode
P1323[3]	Programmable V/f volt. coord. 2	P1759[3]	T(wait) for n-adaption to settle
P1324[3]	Programmable V/f freq. coord. 3	P1764[3]	Kp of n-adaption (SLVC)
P1325[3]	Programmable V/f volt. coord. 3	P1767[3]	Tn of n-adaption (SLVC)
P1333[3]	Start frequency for FCC	P1780[3]	Control word of Rs/Rr-adaption
P1335[3]	Slip compensation	P1781[3]	Tn of Rs-adaption
P1336[3]	Slip limit	P1786[3]	Tn of Xm-adaption
P1338[3]	Resonance damping gain V/f	P1803[3]	Max. modulation
P1340[3]	I _{max} controller prop. gain	P1820[3]	Reverse output phase sequence
P1341[3]	I _{max} controller integral time	P1909[3]	Ctrl. word of motor data ident.
P1345[3]	I _{max} voltage ctrl. prop. gain	P2000[3]	Reference frequency
P1346[3]	I _{max} voltage ctrl. integral time	P2001[3]	Reference voltage
P1350[3]	Voltage soft start	P2002[3]	Reference current
P1400[3]	Configuration of speed control	P2003[3]	Reference torque
P1442[3]	Filter time for act. speed	r2004[3]	Reference power
P1452[3]	Filter time for act.speed (SLVC)	P2150[3]	Hysteresis frequency f _{hys}
P1460[3]	Gain speed controller	P2153[3]	Time-constant speed filter
P1462[3]	Integral time speed controller	P2155[3]	Threshold frequency f ₁
P1470[3]	Gain speed controller (SLVC)	P2156[3]	Delay time of threshold freq f ₁
P1472[3]	Integral time n-ctrl. (SLVC)	P2157[3]	Threshold frequency f ₂
P1488[3]	Droop input source	P2158[3]	Delay time of threshold freq f ₂
P1489[3]	Droop scaling	P2159[3]	Threshold frequency f ₃
P1496[3]	Scaling accel. precontrol	P2160[3]	Delay time of threshold freq f ₃
P1499[3]	Scaling accel. torque control	P2161[3]	Min. threshold for freq. setp.
P1520[3]	CO: Upper torque limit	P2162[3]	Hysteresis freq. for overspeed
P1521[3]	CO: Lower torque limit	P2163[3]	Entry freq. for perm. deviation
P1525[3]	Scaling lower torque limit	P2164[3]	Hysteresis frequency deviation
P1530[3]	Motoring power limitation	P2165[3]	Delay time permitted deviation
P1531[3]	Regenerative power limitation	P2166[3]	Delay time ramp up completed
		P2167[3]	Switch-off frequency f _{off}

P2168[3]	Delay time T_off
P2170[3]	Threshold current I_thresh
P2171[3]	Delay time current
P2172[3]	Threshold DC-link voltage
P2173[3]	Delay time DC-link voltage
P2174[3]	Torque threshold M_thresh
P2176[3]	Delay time for torque threshold
P2177[3]	Delay time for motor is blocked
P2178[3]	Delay time for motor pulled out
P2181[3]	Belt failure detection mode
P2182[3]	Belt threshold frequency 1
P2183[3]	Belt threshold frequency 2
P2184[3]	Belt threshold frequency 3

P2185[3]	Upper torque threshold 1
P2186[3]	Lower torque threshold 1
P2187[3]	Upper torque threshold 2
P2188[3]	Lower torque threshold 2
P2189[3]	Upper torque threshold 3
P2190[3]	Lower torque threshold 3
P2192[3]	Time delay for belt failure
P2480[3]	Position mode
P2481[3]	Gearbox ratio input
P2482[3]	Gearbox ratio output
P2484[3]	No. of shaft turns = 1 Unit
P2487[3]	Positional error trim value
P2488[3]	Distance / No. of revolutions

1.5 Binector Input Parameter

P0731[3]	BI: Function of digital output 0
P0732[3]	BI: Function of digital output 1
P0810	BI: CDS bit 0 (Hand/Auto)
P0811	BI: CDS bit 1
P0820	BI: DDS bit 0
P0821	BI: DDS bit 1
P0840[3]	BI: ON/OFF1
P0842[3]	BI: ON reverse/OFF1
P0844[3]	BI: 1. OFF2
P0845[3]	BI: 2. OFF2
P0848[3]	BI: 1. OFF3
P0849[3]	BI: 2. OFF3
P0852[3]	BI: Pulse enable
P1055[3]	BI: Enable JOG right
P1056[3]	BI: Enable JOG left
P1074[3]	BI: Disable additional setpoint
P1110[3]	BI: Inhibit neg. freq. setpoint
P1113[3]	BI: Reverse
P1124[3]	BI: Enable JOG ramp times
P1140[3]	BI: RFG enable
P1141[3]	BI: RFG start
P1142[3]	BI: RFG enable setpoint
P1477[3]	BI: Set integrator of n-ctrl.
P1492[3]	BI: Enable droop
P1501[3]	BI: Change to torque control

P2103[3]	BI: 1. Faults acknowledgement
P2104[3]	BI: 2. Faults acknowledgement
P2106[3]	BI: External fault
P2810[2]	BI: AND 1
P2812[2]	BI: AND 2
P2814[2]	BI: AND 3
P2816[2]	BI: OR 1
P2818[2]	BI: OR 2
P2820[2]	BI: OR 3
P2822[2]	BI: XOR 1
P2824[2]	BI: XOR 2
P2826[2]	BI: XOR 3
P2828	BI: NOT 1
P2830	BI: NOT 2
P2832	BI: NOT 3
P2834[4]	BI: D-FF 1
P2837[4]	BI: D-FF 2
P2840[2]	BI: RS-FF 1
P2843[2]	BI: RS-FF 2
P2846[2]	BI: RS-FF 3
P2849	BI: Timer 1
P2854	BI: Timer 2
P2859	BI: Timer 3
P2864	BI: Timer 4

1.6 Connector Input Parameter

P0095[10]	CI: Display PZD signals
P1071[3]	CI: Main setpoint scaling
P1076[3]	CI: Additional setpoint scaling
P1330[3]	CI: Voltage setpoint
P1478[3]	CI: Set integrator value n-ctrl.
P1503[3]	CI: Torque setpoint
P1511[3]	CI: Additional torque setpoint
P1522[3]	CI: Upper torque limit
P1523[3]	CI: Lower torque limit
P2016[8]	CI: PZD to USS on RS232
P2051[8]	CI: PZD to Fieldbus

P2869[2]	CI: ADD 1
P2871[2]	CI: ADD 2
P2873[2]	CI: SUB 1
P2875[2]	CI: SUB 2
P2877[2]	CI: MUL 1
P2879[2]	CI: MUL 2
P2881[2]	CI: DIV 1
P2883[2]	CI: DIV 2
P2885[2]	CI: CMP 1
P2887[2]	CI: CMP 2

1.7 Binector Output Parameter

r2032	BO: CtrlWrd1 from USS on RS232
r2033	BO: CtrlWrd2 from USS on RS232
r2090	BO: Control word 1 from Fieldbus
r2091	BO: Control word 2 from Fieldbus
r2811	BO: AND 1
r2813	BO: AND 2
r2815	BO: AND 3
r2817	BO: OR 1
r2819	BO: OR 2
r2821	BO: OR 3
r2823	BO: XOR 1
r2825	BO: XOR 2
r2827	BO: XOR 3
r2829	BO: NOT 1
r2831	BO: NOT 2
r2833	BO: NOT 3
r2835	BO: Q D-FF 1
r2836	BO: NOT-Q D-FF 1

r2838	BO: Q D-FF 2
r2839	BO: NOT-Q D-FF 2
r2841	BO: Q RS-FF 1
r2842	BO: NOT-Q RS-FF 1
r2844	BO: Q RS-FF 2
r2845	BO: NOT-Q RS-FF 2
r2847	BO: Q RS-FF 3
r2848	BO: NOT-Q RS-FF 3
r2852	BO: Timer 1
r2853	BO: Nout timer 1
r2857	BO: Timer 2
r2858	BO: Nout timer 2
r2862	BO: Timer 3
r2863	BO: Nout timer 3
r2867	BO: Timer 4
r2868	BO: Nout timer 4
r2886	BO: CMP 1
r2888	BO: CMP 2

1.8 Connector Output Parameter

r0020	CO: Freq. setpoint before RFG
r0021	CO: Act. frequency
r0024	CO: Act. output frequency
r0025	CO: Act. output voltage
r0026[2]	CO: Act. filtered DC-link volt.
r0027	CO: Act. output current
r0029	CO: Flux gen. current
r0030	CO: Torque gen. current
r0031	CO: Act. filtered torque
r0032	CO: Act. filtered power
r0035[3]	CO: Act. motor temperature
r0036	CO: Inverter overload utilization
r0037[2]	CO: Inverter temperature [°C]
r0038	CO: Act. power factor
r0039	CO: Energy consumpt. meter [kWh]
r0051[2]	CO: Active drive data set (DDS)
r0061	CO: Act. rotor speed
r0062	CO: Freq. setpoint
r0063	CO: Act. frequency
r0064	CO: Dev. frequency controller
r0065	CO: Slip frequency
r0066	CO: Act. output frequency
r0067	CO: Act. output current limit
r0068	CO: Output current
r0069[6]	CO: Act. phase currents
r0070	CO: Act. DC-link voltage
r0071	CO: Max. output voltage
r0072	CO: Act. output voltage
r0074	CO: Act. modulation
r0075	CO: Current setpoint Isd
r0076	CO: Act. current Isd
r0077	CO: Current setpoint Isq
r0078	CO: Act. current Isq
r0079	CO: Torque setpoint (total)
r0080	CO: Act. torque
r0084	CO: Act. air gap flux
r0085	CO: Act. re-active current
r0086	CO: Act. active current
r0090	CO: Act. rotor angle
r0394	CO: Stator resistance IGBT [%]
r0395	CO: Total stator resistance [%]
r0396	CO: Act. rotor resistance
r0630[3]	CO: Ambient temperature
r0631[3]	CO: Stator iron temperature
r0632[3]	CO: Stator winding temperature
r0633[3]	CO: Rotor winding temperature
r1078	CO: Total frequency setpoint
r1079	CO: Selected frequency setpoint
r1114	CO: Freq. setp. after dir. ctrl.
r1119	CO: Freq. setpoint before RFG
r1170	CO: Frequency setpoint after RFG
r1315	CO: Total boost voltage
r1337	CO: V/f slip frequency
r1343	CO: I _{max} controller freq. output
r1344	CO: I _{max} controller volt. output
r1438	CO: Freq. setpoint to controller
r1445	CO: Act. filtered frequency
r1482	CO: Integral output of n-ctrl.
r1490	CO: Droop frequency
r1508	CO: Torque setpoint
r1515	CO: Additional torque setpoint
r1518	CO: Acceleration torque
P1520[3]	CO: Upper torque limit
P1521[3]	CO: Lower torque limit
r1526	CO: Upper torque limitation
r1527	CO: Lower torque limitation
r1536	CO: Max. trq. motoring current
r1537	CO: Max trq regenerative current
r1538	CO: Upper torque limit (total)
r1539	CO: Lower torque limit (total)
P1570[3]	CO: Fixed value flux setpoint
r1583	CO: Flux setpoint (smoothed)
r1597	CO: Outp. field weak. controller
r1598	CO: Flux setpoint (total)
r1718	CO: Output of Isq controller
r1719	CO: Integral output of Isq ctrl.
r1723	CO: Output of Isd controller
r1724	CO: Integral output of Isd ctrl.
r1725	CO: Integral limit of Isd ctrl.
r1728	CO: Decoupling voltage

r1746	CO: Actual flux variance
r1770	CO: Prop. output of n-adaption
r1771	CO: Int. output of n-adaption
r1778	CO: Flux angle difference
r1801	CO: Act. pulse frequency
r2015[8]	CO: PZD from USS on RS232
r2050[8]	CO: PZD from Fieldbus
r2059[5]	CO: Displays SOL link stats for Sol Master.
r2169	CO: Act. filtered frequency
r2870	CO: ADD 1
r2872	CO: ADD 2

r2874	CO: SUB 1
r2876	CO: SUB 2
r2878	CO: MUL 1
r2880	CO: MUL 2
r2882	CO: DIV 1
r2884	CO: DIV 2
P2889	CO: Fixed setpoint 1 in [%]
P2890	CO: Fixed setpoint 2 in [%]
P3952[5]	CO: Memory value (integer)
P3953	CO: Memory value (float)
P3999	CO: Initial loading
r9660	CO: SI remaining time until test stop

1.9 Connector/Binector Output Parameter

r0050	CO/BO: Active command data set
r0052	CO/BO: Act. status word 1
r0053	CO/BO: Act. status word 2
r0054	CO/BO: Act. control word 1
r0055	CO/BO: Act. control word 2
r0056	CO/BO: Status of motor control
r0403	CO/BO: Encoder status word

r0722	CO/BO: Binary input values
r0747	CO/BO: State of digital outputs
r1407	CO/BO: Status 2 of motor control
r2197	CO/BO: Monitoring word 1
r2198	CO/BO: Monitoring word 2
r9771	CO/BO: SI hardware functions
r9772	CO/BO: SI status word

1.10 Parameter description

Note

Level 4 parameters must not be changed.

r0000	Drive display	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 1
	P-Group: ALWAYS				
	Displays the user selected output as defined in P0005.				
	Note: Pressing the "Fn" button for 2 seconds allows the user to view the values of DC link voltage, output frequency, output voltage, output current, and chosen r0000 setting (defined in P0005).				
r0002	Drive state	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 2
	P-Group: COMMANDS				
	Displays actual drive state.				
	Possible Settings:				
	0 Commissioning mode (P0010 != 0)				
	1 Drive ready				
	2 Drive fault active				
	3 Drive starting (Vdc precharging)				
	4 Drive running				
	5 Stopping (ramping down)				
	Dependency: State 3 visible only while precharging DC link.				
P0003	User access level	Datatype: U16	Unit: -	Min: 0 Def: 1 Max: 4	Level 1
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: ALWAYS				
	Defines user access level to parameter sets. The default setting (standard) is sufficient for most simple applications.				
	Possible Settings:				
	0 User defined parameter list				
	1 Standard				
	2 Extended				
	3 Expert				
	4 Service: Password protected				
P0004	Parameter filter	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 22	Level 1
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: ALWAYS				
	Filters available parameters according to functionality to enable a more focussed approach to commissioning.				
	Possible Settings:				
	0 All parameters				
	2 Inverter				
	3 Motor				
	4 Speed sensor				
	7 Commands, binary I/O				
	8 DAC				
	10 Setpoint channel / RFG				
	11 Safety functions				
	12 Drive features				
	13 Motor control				
	20 Communication				
	21 Alarms / warnings / monitoring				
	22 Technology controller				

P0010	Commissioning parameter				Min: 0	Level 1
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: ALWAYS	Active: first confirm	QuickComm.: No	Max: 95		

Filters parameters so that only those related to a particular functional group are selected.

Possible Settings:

- 0 Ready
- 1 Quick commissioning
- 2 Inverter
- 29 Download
- 30 Factory setting
- 95 Safety comm. (only ICU24F)

Dependency:

Reset to 0 for inverter to run.

P0003 (user access level) also determines access to parameters.

Note:

P0010 = 1

The inverter can be commissioned very quickly and easily by setting P0010 = 1.

After that only the important parameters (e.g.: P0304, P0305, etc.) are visible.

The value of these parameters must be entered one after the other.

The end of quick commissioning and the start of internal calculation will be done by setting P3900 = 1 - 3.

Afterward parameter P0010 and P3900 will be reset to zero automatically.

P0010 = 2

For service purposes only.

P0010 = 29

To transfer a parameter file via PC tool (e.g.: STARTER) parameter P0010 will be set to 29 by the PC tool.

When download has been finished PC tool resets parameter P0010 to zero.

P0010 = 30

When resetting the parameters of inverter P0010 must be set to 30.

Resetting of the parameters will be started by setting parameter P0970 = 1.

The inverter will automatically reset all its parameters to their default settings.

This can prove beneficial if you experience problems during parameter setup and wish to start again.

Duration of factory setting will take about 60 s.

P0010 = 95 (on ICU24F only)

Safety Parameter must be changed as follows:

1. set p0003 = 3
2. set p0010 = 95
3. enter password in p9761
4. change safety parameter
5. end safety commissioning via p3900. p3900 = 10 ==> accept changes, p3900 = 11 ==> don't accept changes.

P0011	Lock for user defined parameter				Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: FUNC	Active: first confirm	QuickComm.: No	Max: 65535		

Details:

See parameter P0013 (user defined parameter)

P0012	Key for user defined parameter				Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: FUNC	Active: first confirm	QuickComm.: No	Max: 65535		

Details:

See parameter P0013 (user defined parameter).

P0013[20]	User defined parameter			Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	P-Group: FUNC	Active: first confirm	QuickComm.: No	Max: 65535	

Defines a limited set of parameters to which the end user will have access.

Instructions for use:

1. Set P0003 = 3 (expert user).
2. Go to P0013 indices 0 to 16 (user list)
3. Enter into P0013 index 0 to 16 the parameters required to be visible in the user-defined list.

The following values are fixed and cannot be changed:

- P0013 index 19 = 12 (key for user defined parameter)
- P0013 index 18 = 10 (commissioning parameter filter)
- P0013 index 17 = 3 (user access level)

4. Set P0003 = 0 to activate the user defined parameter.

Index:

P0013[0] : 1st user parameter
P0013[1] : 2nd user parameter
P0013[2] : 3rd user parameter
P0013[3] : 4th user parameter
P0013[4] : 5th user parameter
P0013[5] : 6th user parameter
P0013[6] : 7th user parameter
P0013[7] : 8th user parameter
P0013[8] : 9th user parameter
P0013[9] : 10th user parameter
P0013[10] : 11th user parameter
P0013[11] : 12th user parameter
P0013[12] : 13th user parameter
P0013[13] : 14th user parameter
P0013[14] : 15th user parameter
P0013[15] : 16th user parameter
P0013[16] : 17th user parameter
P0013[17] : 18th user parameter
P0013[18] : 19th user parameter
P0013[19] : 20th user parameter

Dependency:

First, set P0011 ("lock") to a different value than P0012 ("key") to prevent changes to user-defined parameter.

Then, set P0003 to 0 to activate the user-defined list.

When locked and the user-defined parameter is activated, the only way to exit the user-defined parameter (and view other parameters) is to set P0012 ("key") to the value in P0011 ("lock").

Note:

Alternatively, set P0010 = 30 (commissioning parameter filter = factory setting) and P0970 = 1 (factory reset) to perform a complete factory reset.

The default values of P0011 ("lock") and P0012 ("key") are the same.

P0014[3]	Store mode	Datatype: U16	Unit: -	Min: 0	Level 3
	CStat: UT	Active: first confirm	QuickComm.: No	Def: 0	
	P-Group: -			Max: 1	

Sets the store mode for parameters.

The store mode can be configured for all interfaces listed under "Index".

Possible Settings:

- 0 Volatile (RAM)
- 1 Nonvolatile (EEPROM)

Index:

- P0014[0] : reserved
- P0014[1] : USS on RS232
- P0014[2] : Fieldbus

Note:

An independent store request may be part of the serial communications (e.g. PKE bits 15-12 of USS protocol), set by a PLC or PC tools like STARTER. See the table below for an influence on the settings of P0014.

1. P0014 itself will always be stored in the EEPROM.
2. P0014 will not be changed by performing a factory reset (P0010 = 30 and P0971 = 1).
3. P0014 can be transferred during a DOWNLOAD.
4. If "Store request via USS = volatile (RAM)" and "P0014[x] = volatile (RAM)", you can make a transfer of all parameter values into the nonvolatile memory via P0971.
5. If "Store request via USS" and P0014[x] are not consistent, the setting of P0014[x] = "store nonvolatile (EEPROM)" has always higher priority.

Store request via USS	Value of p0014[x]	Result
EEPROM	RAM	EEPROM
EEPROM	EEPROM	EEPROM
RAM	RAM	RAM
RAM	EEPROM	EEPROM

When transferring parameter p0014, ET 200S FC uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations.

This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):

- Parameter fault 30
- Drive fault 70
- Drive fault 75

When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.

The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

r0018	Firmware version	Datatype: Float	Unit: -	Min: -	Level 1
	P-Group: INVERTER			Def: -	
				Max: -	

Displays version number of installed firmware.

r0020	CO: Freq. setpoint before RFG	Datatype: Float	Unit: Hz	Min: -	Level 3
	P-Group: CONTROL			Def: -	
				Max: -	

Displays actual frequency setpoint (input from ramp function generator).

r0021	CO: Act. frequency	Datatype: Float	Unit: Hz	Min: -	Level 2
	P-Group: CONTROL			Def: -	
				Max: -	

Displays actual inverter output frequency (r0024) excluding slip compensation, resonance damping and frequency limitation.

r0022	Act. filtered rotor speed	Datatype: Float	Unit: 1/min	Min: -	Level 3
	P-Group: CONTROL			Def: -	
				Max: -	

Displays calculated rotor speed based on inverter output frequency [Hz] x 120 / number of poles.

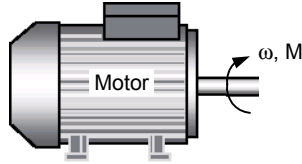
Note:

This calculation makes no allowance for load-dependent slip.

r0024	CO: Act. output frequency	Datatype: Float	Unit: Hz	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays actual output frequency (slip compensation, resonance damping and frequency limitation are included).				
r0025	CO: Act. output voltage	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 2
	P-Group: CONTROL				
	Displays [rms] voltage applied to motor.				
r0026[2]	CO: Act. filtered DC-link volt.	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 2
	P-Group: INVERTER				
	Displays DC-link voltage.				
	Index:	P0026[0] : Compensation DC volt Channel P0026[1] : Meas/Monit DC volt Channel			
r0027	CO: Act. output current	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 2
	P-Group: CONTROL				
	Displays rms value of motor current [A].				
r0029	CO: Flux gen. current	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays flux-generating current component.				
	The flux-generating current component is based on the nominal flux, which is calculated from the motor parameters (P0340 - Calculation of motor parameters).				
	Dependency:	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			
	Note:	The flux-generating current component is generally constant up to the base speed of the motor; above base speed, this component is weakened (field weakening) thus enabling an increase in motor speed but at reduced torque.			
r0030	CO: Torque gen. current	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays torque-generating current component.				
	The torque-generating current component is calculated from the torque setpoint values delivered by the speed regulator.				
	Dependency:	Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.			
	Note:	For asynchronous motors, a limit is calculated for the torque generating current component (in conjunction with the maximum possible output voltage (r0071), motor leakage and current field weakening (r0377)) and this prevents motor stalling.			
r0031	CO: Act. filtered torque	Datatype: Float	Unit: Nm	Min: - Def: - Max: -	Level 2
	P-Group: CONTROL				
	Displays electrical torque. Output value will be zero at low speeds when current injection is active (r1751.4 = 1).				
	Note:	The electrical torque is not the same as the mechanical torque, which can be measured on the shaft. Due to windage and friction a part of the electrical torque is lost in the motor.			

r0032	CO: Act. filtered power	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level 2
	P-Group: CONTROL				

Displays motor power.



$$P_{mech} = \omega \cdot M = 2 \cdot \pi \cdot f \cdot M$$

$$\Rightarrow r0032 [kW] = \frac{1}{1000} \cdot 2 \cdot \pi \cdot \frac{r0022}{60} [1/min] \cdot r0031 [Nm]$$

$$r0032 [hp] = 0.75 \cdot r0032 [kW]$$

Dependency:

Value is displayed in [kW] or [hp] depending on setting for P0100 (operation for Europe / North America).

r0035[3]	CO: Act. motor temperature	Datatype: Float	Unit: °C	Min: - Def: - Max: -	Level 2
	P-Group: MOTOR				

Displays measured motor temperature.

Index:

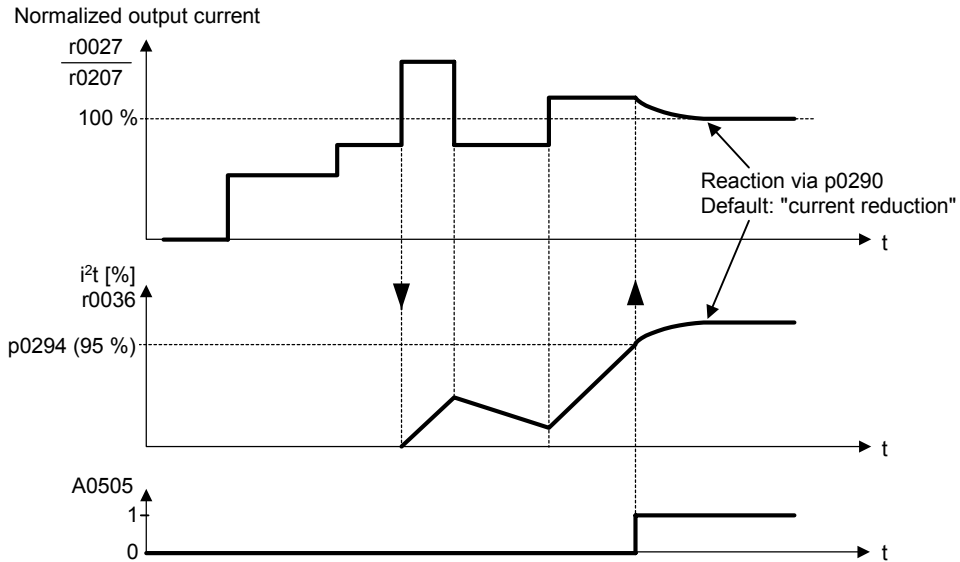
- P0035[0] : 1st. Drive data set (DDS)
- P0035[1] : 2nd. Drive data set (DDS)
- P0035[2] : 3rd. Drive data set (DDS)

r0036	CO: Inverter overload utilization	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
	P-Group: INVERTER				

Displays inverter overload utilization calculated via the I2t model.

The actual I2t value relative to the max. possible I2t value supplies utilization in [%].
 If the current exceeds the threshold for P0294 (inverter I2t overload warning), alarm A0505 (inverter I2t) is generated and the output current of the inverter reduced via P0290 (inverter overload reaction).
 If 100 % utilization is exceeded, F0005 (inverter I2t) is tripped.

Example:



Dependency:

r0036 > 0:
 If the nominal current (see r0207) of the inverter is exceeded, utilization will be displayed.
 Otherwise, 0 % utilization is displayed.

r0037[2]	CO: Inverter temperature [°C] Datatype: Float Unit: °C P-Group: INVERTER	Min: - Def: - Max: -	Level 3
Displays measured heatsink temperature and calculated junction temperature of IGBTs based on thermal model.			
Index: P0037[0] : Measured heat sink temperature P0037[1] : Chip temperature			
r0038	CO: Act. power factor Datatype: Float Unit: - P-Group: CONTROL	Min: - Def: - Max: -	Level 3
Displays actual power factor.			
Dependency: Applies when V/f control is selected in P1300 (control mode); otherwise, the display shows the value one.			
r0039	CO: Energy consumpt. meter [kWh] Datatype: Float Unit: kWh P-Group: INVERTER	Min: - Def: - Max: -	Level 2
Displays electrical energy used by inverter since display was last reset (see P0040 - reset energy consumption meter).			
Dependency: Value is reset when P0040 = 1 reset energy consumption meter.			
P0040	Reset energy consumption meter CStat: CT Datatype: U16 Unit: - P-Group: INVERTER Active: first confirm QuickComm.: No Max: 1	Min: 0 Def: 0 Max: 1	Level 2
Resets value of parameter r0039 (energy consumption meter) to zero.			
Possible Settings: 0 No reset 1 Reset r0039 to 0			
r0050	CO/BO: Active command data set Datatype: U16 Unit: - P-Group: COMMANDS	Min: - Def: - Max: -	Level 2
Displays currently selected and active command data set (CDS).			
Possible Settings: 0 1st. Command data set (CDS) 1 2nd. Command data set (CDS) 2 3rd. Command data set (CDS)			
Details: See parameter P0810.			
r0051[2]	CO: Active drive data set (DDS) Datatype: U16 Unit: - P-Group: COMMANDS	Min: - Def: - Max: -	Level 2
Displays currently selected and active drive data set (DDS).			
Possible Settings: 0 1st. Drive data set (DDS) 1 2nd. Drive data set (DDS) 2 3rd. Drive data set (DDS)			
Index: P0051[0] : Selected drive data set P0051[1] : Active drive data set			
Details: See parameter P0820.			

r0052	CO/BO: Act. status word 1	Min: -	Level 2
	Datatype: U16	Unit: -	
	P-Group: COMMANDS	Def: - Max: -	

Displays first active status word of inverter (bit format) and can be used to diagnose inverter status.

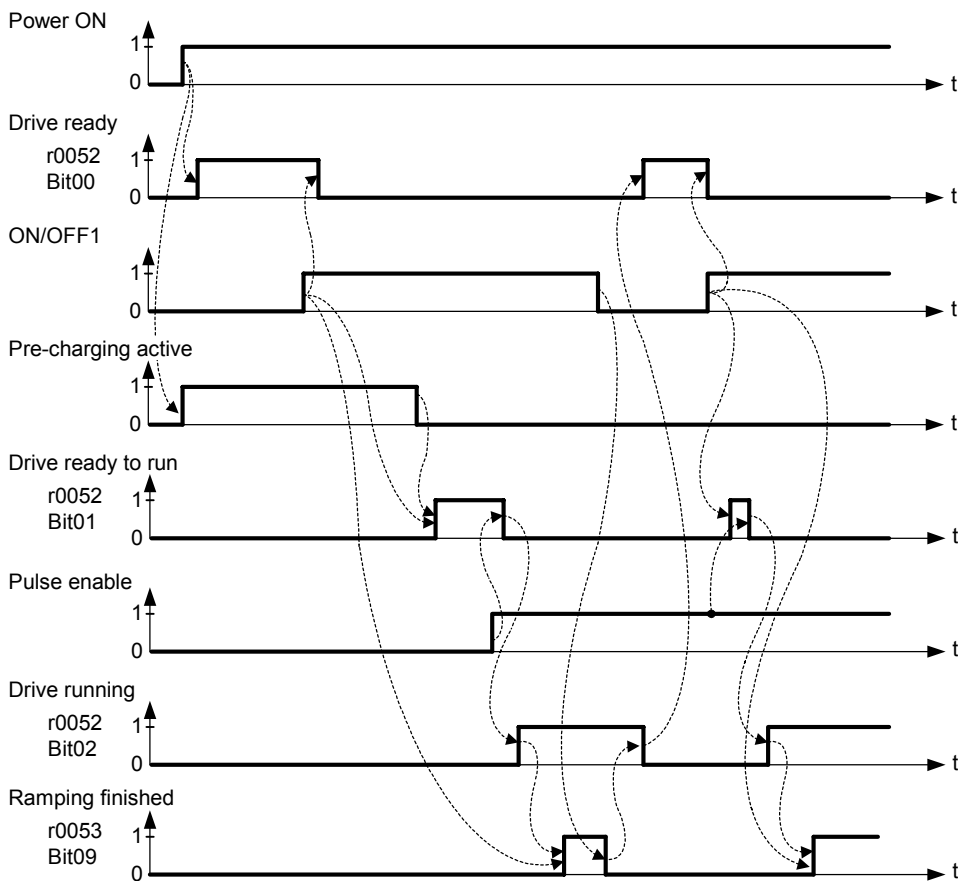
Bitfields:

Bit00	Drive ready	0	No	1	Yes
Bit01	Drive ready to run	0	No	1	Yes
Bit02	Drive running	0	No	1	Yes
Bit03	Drive fault active	0	No	1	Yes
Bit04	OFF2 active	0	Yes	1	No
Bit05	OFF3 active	0	Yes	1	No
Bit06	ON inhibit active	0	No	1	Yes
Bit07	Drive warning active	0	No	1	Yes
Bit08	Deviation setp. / act. value	0	Yes	1	No
Bit09	PZD control	0	No	1	Yes
Bit10	f_act >= P1082 (f_max)	0	No	1	Yes
Bit11	Warning: Motor current limit	0	Yes	1	No
Bit12	Motor holding brake active	0	No	1	Yes
Bit13	Motor overload	0	Yes	1	No
Bit14	Motor runs right	0	No	1	Yes
Bit15	Inverter overload	0	Yes	1	No

Dependency:

r0052 Bit00 - Bit02:

State-sequence diagram after Power On or ON/OFF1 respectively: ==> see below



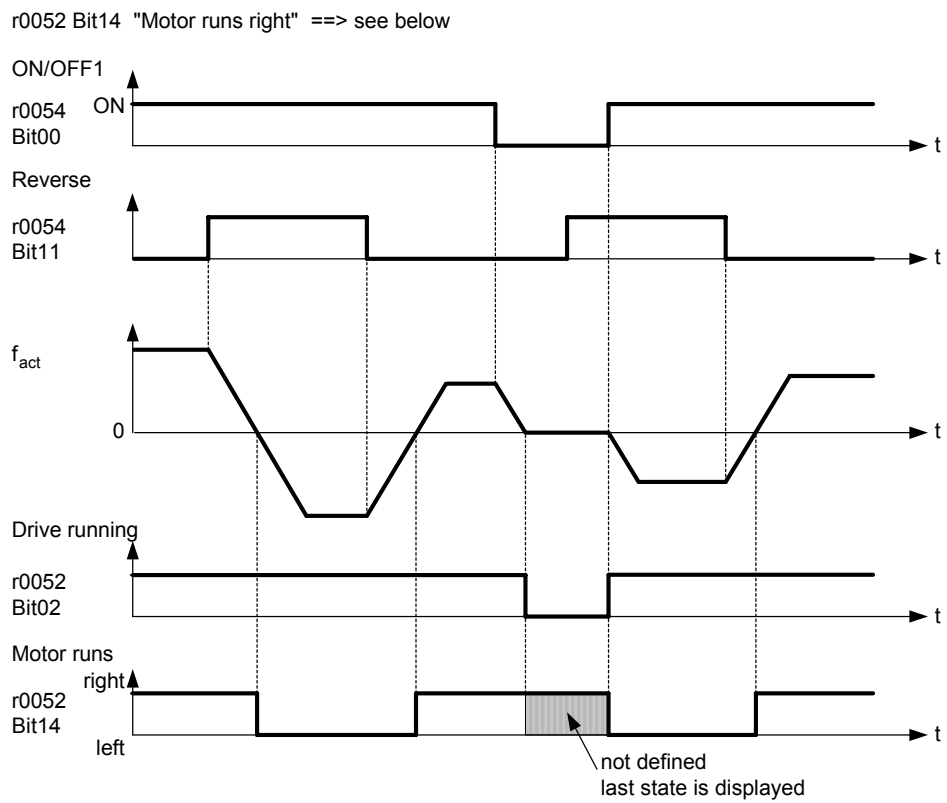
r0052 Bit03 "Drive fault active":

Output of Bit3 (Fault) will be inverted on digital output (Low = Fault, High = No Fault).

r0052 Bit08 "Deviation setpoint / act. value" ==> see parameter P2164

r0052 Bit10 "f_act >= P1082 (f_max)" ==> see parameter P1082

r0052 Bit12 "Motor holding brake active" ==> see parameter P1215



r0053	CO/BO: Act. status word 2	Datatype: U16	Unit: -	Min: -	Level 2
	P-Group: COMMANDS			Def: - Max: -	

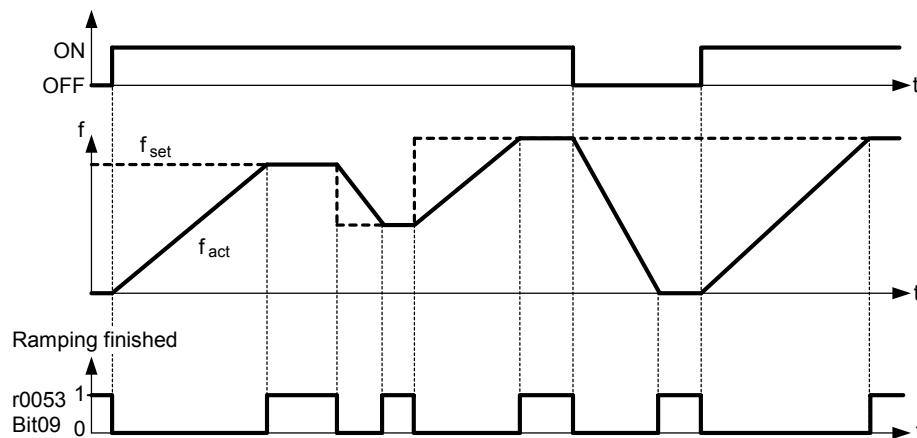
Displays second status word of inverter (in bit format).

Bitfields:

Bit01	f_act > P2167	0	No	1	Yes
Bit02	f_act > P1080	0	No	1	Yes
Bit03	Act. current r0027 >= P2170	0	No	1	Yes
Bit04	f_act > P2155	0	No	1	Yes
Bit05	f_act <= P2155	0	No	1	Yes
Bit06	f_act >= setpoint	0	No	1	Yes
Bit07	Vdc_act r0026 < P2172	0	No	1	Yes
Bit08	Vdc_act r0026 > P2172	0	No	1	Yes
Bit09	Ramping finished	0	No	1	Yes

Notice:

- r0053 Bit01 "f_act > P2167 (f_off)" ==> see parameter P2167
- r0053 Bit02 "f_act > P1080 (f_min)" ==> see parameter P1080
- r0053 Bit03 "Act. current r0027 >= P2170" ==> see parameter P2170
- r0053 Bit04 "f_act > P2155 (f_1)" ==> see parameter P2155
- r0053 Bit05 "f_act <= P2155 (f_1)" ==> see parameter P2155
- r0053 Bit06 "f_act >= setpoint (f_set)" ==> see parameter P2150
- r0053 Bit07 "Vdc_act r0026 < P2172" ==> see parameter P2172
- r0053 Bit08 "Vdc_act r0026 > P2172" ==> see parameter P2172
- r0053 Bit09 "Ramping finished" ==> see below



r0054	CO/BO: Act. control word 1	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: COMMANDS			Def: - Max: -	

Displays first control word of inverter (in bit format) and can be used to diagnose which commands are active.

Bitfields:

Bit00	ON/OFF1	0	No	1	Yes
Bit01	OFF2: Electrical stop	0	Yes	1	No
Bit02	OFF3: Fast stop	0	Yes	1	No
Bit03	Pulse enable	0	No	1	Yes
Bit04	RFG enable	0	No	1	Yes
Bit05	RFG start	0	No	1	Yes
Bit06	Setpoint enable	0	No	1	Yes
Bit07	Fault acknowledge	0	No	1	Yes
Bit08	JOG right	0	No	1	Yes
Bit09	JOG left	0	No	1	Yes
Bit10	Control from PLC	0	No	1	Yes
Bit11	Reverse (setpoint inversion)	0	No	1	Yes
Bit15	CDS Bit 0 (Hand/Auto)	0	No	1	Yes

Notice:

r0054 is identical to r2036 if USS is selected as command source via P0700 or P0719.

**Caution:**

if bit 10 is set to 0, the drive ignores any commands or setpoints. The drive can't neither be switched on nor off.

r0055	CO/BO: Act. control word 2	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: COMMANDS			Def: - Max: -	

Displays additional control word of inverter (in bit format) and can be used to diagnose which commands are active.

Bitfields:

Bit04	Drive data set (DDS) Bit 0	0	No	1	Yes
Bit05	Drive data set (DDS) Bit 1	0	No	1	Yes
Bit11	Enable Droop	0	No	1	Yes
Bit12	Torque control	0	No	1	Yes
Bit13	External fault 1	0	Yes	1	No
Bit15	Command data set (CDS) Bit 1	0	No	1	Yes

Notice:

r0055 is identical to r2037 if USS is selected as command source via P0700 or P0719.

r0056	CO/BO: Status of motor control	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays status of motor control (in bit format), which can be used to diagnose inverter status.

Bitfields:

Bit00	Init. control finished	0	No	1	Yes
Bit01	Motor demagnetizing finished	0	No	1	Yes
Bit02	Pulses enabled	0	No	1	Yes
Bit03	Voltage soft start select	0	No	1	Yes
Bit04	Motor excitation finished	0	No	1	Yes
Bit05	Starting boost active	0	No	1	Yes
Bit06	Acceleration boost active	0	No	1	Yes
Bit07	Frequency is negative	0	No	1	Yes
Bit08	Field weakening active	0	No	1	Yes
Bit09	Volts setpoint limited	0	No	1	Yes
Bit10	Slip frequency limited	0	No	1	Yes
Bit11	F _{out} > F _{max} Freq. limited	0	No	1	Yes
Bit12	Phase reversal selected	0	No	1	Yes
Bit13	I-max controller active	0	No	1	Yes

Notice:

The I-max controller (r0056 Bit13) will be activated when the actual output current (r0027) exceeds the current limit in r0067.

r0061	CO: Act. rotor speed	Datatype: Float	Unit: Hz	Min: -	Level 2
	P-Group: CONTROL			Def: - Max: -	

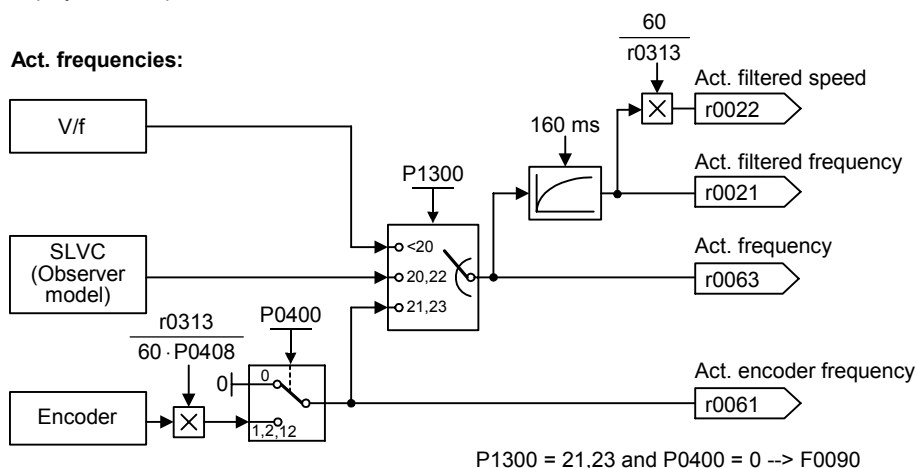
Displays current speed detected by encoder.

r0062	CO: Freq. setpoint	Datatype: Float	Unit: Hz	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays speed setpoint of vector controller.

r0063	CO: Act. frequency	Datatype: Float	Unit: Hz	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays actual speed.



r0064	CO: Dev. frequency controller	Datatype: Float	Unit: Hz	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays actual deviation of speed controller.

This value is calculated from the speed setpoint (r0062) and the actual speed (r0063).

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0065	CO: Slip frequency	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays slip frequency of motor in [%] relative to the rated motor frequency (P0310).

Details:

For V/f control, see also P1335 (slip compensation).

r0066	CO: Act. output frequency	Datatype: Float	Unit: Hz	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays actual output frequency.

Note:

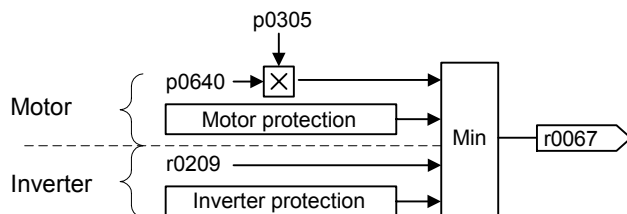
The output frequency is limited by the values entered in P1080 (min. frequency) and P1082 (max. frequency).

r0067	CO: Act. output current limit	Datatype: Float	Unit: A	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays valid maximum output current of inverter.

Parameter r0067 is influenced/determined by the following factors:

- Rated motor current P0305
- Motor overload factor P0640
- Motor protection in dependency of P0610
- r0067 is less than or equal to maximum inverter current r0209
- Inverter protection in dependency of P0290
- With F3E powerstack, r0067 is affected by the regeneration power limit when regenerating



Note:

A reduction of r0067 may indicate an inverter overload or a motor overload.

r0068	CO: Output current	Datatype: Float	Unit: A	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays unfiltered [rms] value of motor current [A].

Note:

Used for process control purposes (in contrast to r0027 (output current), which is filtered and is used to display the value through USS on RS232).

r0069[6]	CO: Act. phase currents	Datatype: Float	Unit: A	Min: -	Level 4
	P-Group: CONTROL			Def: - Max: -	

Displays phase currents.

Index:

- P0069[0] : U_phase
- P0069[1] : V_phase
- P0069[2] : W_phase
- P0069[3] : Off U_phase
- P0069[4] : Off V_phase
- P0069[5] : Off W_phase

r0070	CO: Act. DC-link voltage	Datatype: Float	Unit: V	Min: -	Level 3
	P-Group: INVERTER			Def: - Max: -	

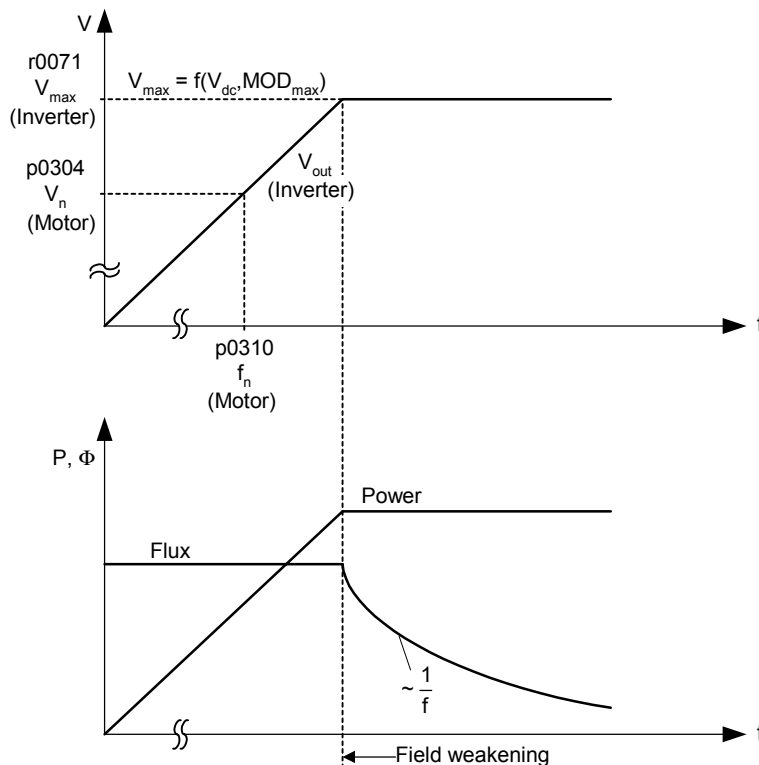
Displays (unfiltered) DC-link voltage.

Note:

Used for process control purposes (in contrast to r0026 (actual DC-link voltage), which is filtered).

r0071	CO: Max. output voltage	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				

Displays maximum output voltage.



Dependency:

Actual maximum output voltage depends on the actual input supply voltage.

r0072	CO: Act. output voltage	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				

Displays output voltage.

r0074	CO: Act. modulation	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
	P-Group: CONTROL				

Displays actual modulation index.

The modulation index is defined as ratio between the magnitude of the fundamental component in the inverter phase output voltage and half of the dc-link voltage.

r0075	CO: Current setpoint Isd	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				

Displays setpoint of flux generating current component.

Dependency:

Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.

r0076	CO: Act. current Isd	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays flux generating current component.				
	Dependency: Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.				
r0077	CO: Current setpoint Isq	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays setpoint for component of torque generating current.				
	Dependency: Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.				
r0078	CO: Act. current Isq	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays component of torque generating current.				
r0079	CO: Torque setpoint (total)	Datatype: Float	Unit: Nm	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays total torque setpoint.				
	Dependency: Applies when vector control is selected in P1300 (control mode); otherwise, the display shows the value zero.				
r0080	CO: Act. torque	Datatype: Float	Unit: Nm	Min: - Def: - Max: -	Level 4
	P-Group: CONTROL				
	Displays actual torque. Output value will be zero at low speeds when current injection is active (r1751.4 = 1).				
r0084	CO: Act. air gap flux	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
	P-Group: CONTROL				
	Displays air gap flux in [%] relative to the rated motor flux.				
r0085	CO: Act. re-active current	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays re-active (imaginary part) of motor current.				
	Dependency: Applies when V/f control is selected in P1300 (control mode); otherwise, the display shows the value zero.				
r0086	CO: Act. active current	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 3
	P-Group: CONTROL				
	Displays active (real part) of motor current.				
	Dependency: Applies when V/f control is selected in P1300 (control mode); otherwise, the display shows the value zero.				
r0090	CO: Act. rotor angle	Datatype: Float	Unit: °	Min: - Def: - Max: -	Level 2
	P-Group: CONTROL				
	Indicates the current angle of the rotor. This function is not available on single input channel encoders.				

P0095[10]	CI: Display PZD signals	Min: 0:0	Level
CStat: CT	Datatype: U32	Def: 0:0	3
P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 40000:0

Selects source of display for PZD signals.

Index:

P0095[0] : 1st PZD signal
P0095[1] : 2nd PZD signal
P0095[2] : 3rd PZD signal
P0095[3] : 4th PZD signal
P0095[4] : 5th PZD signal
P0095[5] : 6th PZD signal
P0095[6] : 7th PZD signal
P0095[7] : 8th PZD signal
P0095[8] : 9th PZD signal
P0095[9] : 10th PZD signal

r0096[10]	PZD signals	Min: -	Level
	Datatype: Float	Unit: %	3
	P-Group: CONTROL	Def: -	Max: -

Displays PZD signals in [%].

Index:

P0096[0] : 1st PZD signal
P0096[1] : 2nd PZD signal
P0096[2] : 3rd PZD signal
P0096[3] : 4th PZD signal
P0096[4] : 5th PZD signal
P0096[5] : 6th PZD signal
P0096[6] : 7th PZD signal
P0096[7] : 8th PZD signal
P0096[8] : 9th PZD signal
P0096[9] : 10th PZD signal

Note:

R0096 = 100 % corresponds to 4000 hex.

P0100	Europe / North America	Min: 0	Level
CStat: C	Datatype: U16	Def: 0	1
P-Group: QUICK	Active: first confirm	QuickComm.: Yes	Max: 2

Determines whether power settings are expressed in [kW] or [hp] (e.g. Rated motor power P0307).

The default settings for the rated motor frequency P0310 and maximum frequency P1082 are also set automatically here, in addition to reference frequency P2000.

Possible Settings:

0 Europe [kW], 50 Hz
1 North America [hp], 60 Hz
2 North America [kW], 60 Hz

Dependency:

Where:

- Stop drive first (i.e. disable all pulses) before you change this parameter.
- Parameter P0100 can only be changed with P0010 = 1 (Commissioning mode) via the respective interface (e.g. USS on RS232).
- Changing P0100 resets all rated motor parameters as well as other parameters that depend on the rated motor parameters (see P0340 - calculation of motor parameters).

P0191	Configuration Control Unit	Min: 0	Level
CStat: CUT	Datatype: U32	Def: 27238853	4
P-Group: FUNC	Active: first confirm	QuickComm.: No	Max: 4294967295

Displays the actual HW-configuration of the Control Unit

P0192	Configuration Power Module	Min: 0	Level
CStat: CUT	Datatype: U32	Def: 0	4
P-Group: FUNC	Active: first confirm	QuickComm.: No	Max: 4294967295

Displays the actual HW-configuration of the converter power modul

P0199	Equipment system number	Min: 0	Level 2
	CStat: UT Datatype: U16 Unit: - Def: 0	QuickComm.: No	
	P-Group: - Active: first confirm		

Equipment system number.
This parameter has no operation effect.

P0201[2]	Act. power stack code number	Min: 0	Level 3
	CStat: CT Datatype: U16 Unit: - Def: 0	QuickComm.: No	
	P-Group: INVERTER Active: Immediately		

Identifies hardware variant as shown in table below.

Index:

- P0201[0] : Powerstack code
- P0201[1] : Functionality version - Last Digit of MLFB

Notice:

Parameter P0201 = 0 indicates that no power stack has been identified.

r0203	Act. inverter type	Min: -	Level 3
	Datatype: U16 Unit: - Def: -	Max: -	
	P-Group: INVERTER		

Type number of actual inverter identified.

Possible Settings:

- 0 No PS Data/Module
- 1 MICROMASTER 420
- 2 MICROMASTER 440
- 3 MICRO- / COMBIMASTER 411
- 4 MICROMASTER 410
- 5 reserved
- 6 MICROMASTER 440 PX
- 7 MICROMASTER 430
- 110 SINAMICS G110
- 111 SINAMICS IPM25
- 114 SINAMICS PM240

r0204	Power stack features	Min: -	Level 3
	Datatype: U32 Unit: - Def: -	Max: -	
	P-Group: INVERTER		

Displays hardware features of power stack.

Bitfields:

Bit00	DC input voltage	0	No	1	Yes
Bit01	RFI filter	0	No	1	Yes
Bit02	F3E Powerstack	0	No	1	Yes

Note:

Parameter r0204 = 0 indicates that no power stack has been identified.

r0206	Rated inverter power [kW] / [hp]	Min: -	Level 2
	Datatype: Float Unit: - Def: -	Max: -	
	P-Group: INVERTER		

Displays nominal rated motor power from inverter.

Dependency:

Value is displayed in [kW] or [hp] depending on setting for P0100 (operation for Europe / North America).

$$r0206 \text{ [hp]} = 0.75 \cdot r0206 \text{ [kW]}$$

r0207[3]	Rated inverter current	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 2
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Displays rated inverter current.

Index:

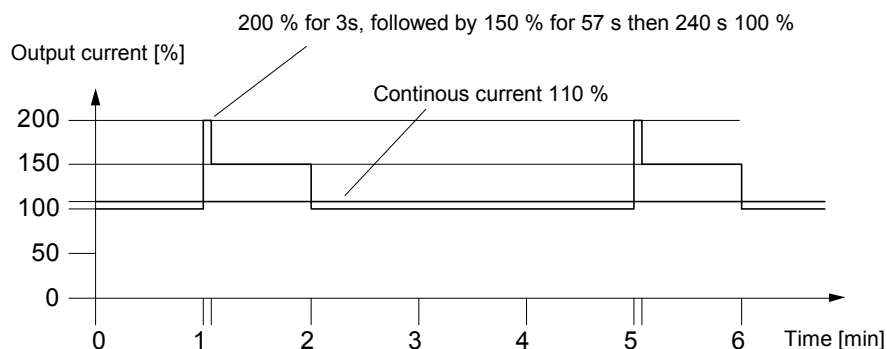
P0207[0] : Rated inverter current
P0207[1] : Rated VT current
P0207[2] : Rated CT current

Note:

The rated VT current r0207[1] and rated CT current r0207[2] displays the suitable 4-pole Siemens standard motor (IEC) for the selected load cycle (see diagram).

The parameters r0207[1], r0207[2] are the default value of P0305 in association with the CT/VT application (load cycle).

If r0207[1] = r0207[2], then no differentiation is possible between CT/VT applications.



r0208	Rated inverter voltage	Datatype: U32	Unit: V	Min: - Def: - Max: -	Level 2
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Displays nominal AC supply voltage of inverter.

Value:

r0208 = 400 : 380 - 480 V +/- 10 %

r0209	Maximum inverter current	Datatype: Float	Unit: A	Min: - Def: - Max: -	Level 2
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Displays maximum output current of inverter.

r0231[2]	Max. cable length	Datatype: U16	Unit: m	Min: - Def: - Max: -	Level 3
-----------------	--------------------------	----------------------	----------------	---	--------------------------

Indexed parameter to display maximum allowable cable length between inverter and motor.

Index:

P0231[0] : Max. unscreened cable length
P0231[1] : Max. screened cable length

Notice:

For full EMC compliance, the screened cable must not exceed 25 m in length when an EMC filter is fitted.

P0290	Inverter overload reaction				Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 2		
	P-Group: INVERTER	Active: first confirm	QuickComm.: No	Max: 3		

Selects reaction of inverter to an internal over-temperature.

Possible Settings:

- 0 Output frequency reduction
- 1 Trip (F0004)
- 2 Pulse & output freq. reduct.
- 3 Pulse freq reduct. then trip

Notice:

- P0290 = 0, 2:
- Reduction of output frequency is only effective if the load is also reduced. This is for example valid for variable torque applications with a quadratic torque characteristic as pumps or fans.
 - For settings P0290 = 0 or 2, the I-max controller will act upon the output current limit (r0067) in case of overtemperature.

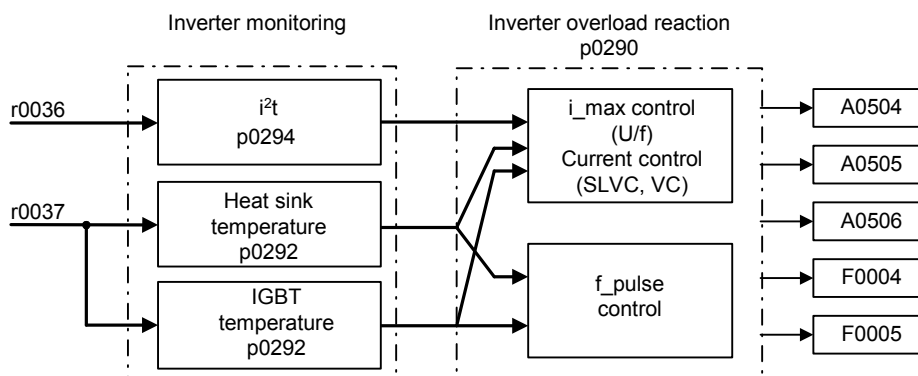
- P0290 = 2, 3:
- The pulse frequency P1800 is reduced only if higher than 2 kHz and if the operating frequency is below 2Hz.
 - The actual pulse frequency is displayed in parameter r1801.

A trip will always result, if the action taken does not sufficiently reduce internal temperature.

Dependency:

Following physical values influence the inverter overload protection (see diagram):

- heat sink temperature
- junction temperature (IGBT temperature)
- inverter I_{2t}



P0291[3]	Inverter protection				Min: 0	Level 4
	CStat: CT	Datatype: U16	Unit: -	Def: 1		
	P-Group: INVERTER	Active: Immediately	QuickComm.: No	Max: 3		

Bit 00 for enabling/disabling automatic pulse frequency reduction at output frequencies below 2 Hz. The benefit is to reduce the noises at frequencies below 2 Hz.
 Bit 02 shows if phase loss detection (input phase) of 3 phase inverters is enabled after factory reset.

Index:

- P0291[0] : 1st. Drive data set (DDS)
- P0291[1] : 2nd. Drive data set (DDS)
- P0291[2] : 3rd. Drive data set (DDS)

Bitfields:

Bit01	reserved	0	No	1	Yes
Bit02	Phase loss detection enable	0	No	1	Yes

Details:

See P0290 (inverter overload reaction)

P0292	Inverter temperature warning				Level 3
	CStat: CUT	Datatype: U16	Unit: °C	Min: 0	
	P-Group: INVERTER	Active: first confirm	QuickComm.: No	Def: 5 Max: 25	

Defines the temperature difference (in °C) between the Overtemperature trip threshold (F0004) and the warning threshold (A0504) of the inverter.

The trip threshold is stored internally by the inverter and cannot be changed by the user.

P0294	Inverter I2t warning				Level 4
	CStat: CUT	Datatype: Float	Unit: %	Min: 10.0	
	P-Group: INVERTER	Active: first confirm	QuickComm.: No	Def: 95.0 Max: 100.0	

Defines the [%] value at which alarm A0505 (inverter I2t) is generated.

Inverter I2t calculation is used to determine a maximum tolerable period for inverter overload.

The I2t calculation value is deemed = 100 % when this maximum tolerable period is reached.

Dependency:

- The output current of the inverter has been reduced.
- The value of I2t does not exceed 100%.

Note:

P0294 = 100 % corresponds to stationary nominal load.

P0295	Inverter fan off delay time				Level 3
	CStat: CUT	Datatype: U16	Unit: s	Min: 0	
	P-Group: TERMINAL	Active: first confirm	QuickComm.: No	Def: 0 Max: 3600	

Defines inverter fan switch off delay time in seconds after drive has stopped.

Note:

Setting to 0, inverter fan will switch off when the drive stops, that is no delay.

P0300[3]	Select motor type	Datatype: U16	Unit: -	Min: 1	Level 2
	CStat: C	Active: first confirm	QuickComm.: Yes	Def: 1	
	P-Group: MOTOR			Max: 2	

Selects motor type.

This parameter is required during commissioning to select motor type and optimize inverter performance. Most motors are asynchronous; if in doubt, use the formula below.

$$x = p0310 \cdot \frac{60}{p0311}$$

x = 1, 2, ..., n : Synchronous motor

x ≠ 1, 2, ..., n : Asynchronous motor

If the result is a whole number, the motor is synchronous.

Possible Settings:

- 1 Asynchronous rotational motor
- 2 Synchronous rotational motor

Index:

- P0300[0] : 1st. Drive data set (DDS)
- P0300[1] : 2nd. Drive data set (DDS)
- P0300[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

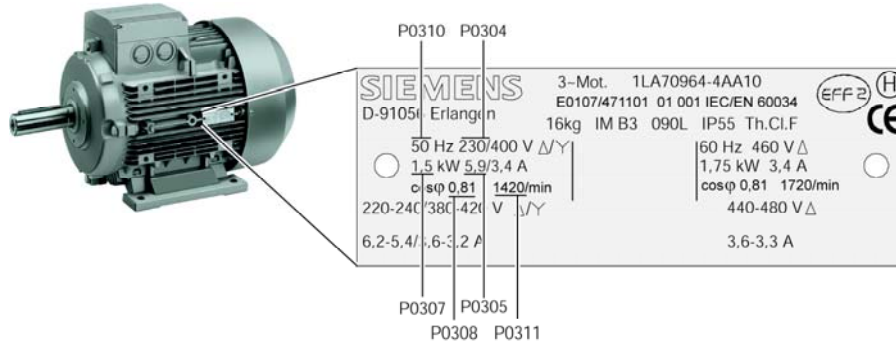
If synchronous motor is selected, the following functions are not available:

- P0308 Power factor
- P0309 Motor efficiency
- P0346 Magnetization time
- P0347 Demagnetization time
- P1335 Slip compensation
- P1336 Slip limit
- P0320 Motor magnetizing current
- P0330 Rated motor slip
- P0331 Rated magnetization current
- P0332 Rated power factor
- P0384 Rotor time constant
- P1200, P1202, P1203 Flying start

P0304[3]	Rated motor voltage	Min: 10	Level 1	
	CStat: C	Datatype: U16		Unit: V
	P-Group: MOTOR	Active: first confirm		QuickComm.: Yes
		Def: 400		
		Max: 2000		

Nominal motor voltage [V] from rating plate.

Following diagram shows a typical rating plate with the locations of the relevant motor data.



Index:

- P0304[0] : 1st. Drive data set (DDS)
- P0304[1] : 2nd. Drive data set (DDS)
- P0304[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

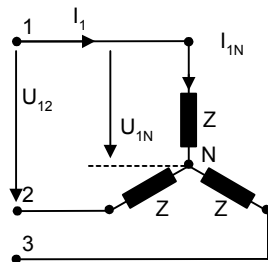
Note:

Default value is depending on inverter type and its rating data.
 Safety Integrated: If driving loads occur in the application, the motor must be dimensioned so that its slip in supersynchronous operation always remains within the rated slip.



Caution:

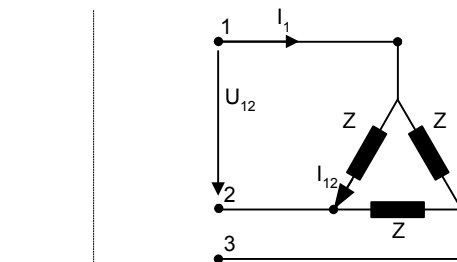
The input of rating plate data must correspond with the wiring of the motor (star / delta).
 This means, if delta wiring is used for the motor, delta rating plate data has to be entered.



$$I_1 = I_2 = I_3$$

$$U_{12} = U_{23} = U_{31} = \sqrt{3} \cdot U_{1N}$$

$$\frac{U_{12}}{I_1} = 2 \cdot Z$$



$$I_{1,\Delta} = \frac{1}{\sqrt{3}} I_{1,Y}$$

$$U_{12,\Delta} = \frac{1}{\sqrt{3}} U_{12,Y}$$

$$Z_{12,\Delta} = \frac{Z_{12,Y}}{3}$$

$$I_{12} = I_{23} = I_{31} = \frac{1}{\sqrt{3}} \cdot I_1$$

$$U_{12} = U_{23} = U_{31}$$

$$\frac{U_{12}}{I_1} = \frac{2}{3} \cdot Z$$

P0305[3]	Rated motor current			Min: 0.01	Level 1
	CStat: C	Datatype: Float	Unit: A	Def: 1.86	
	P-Group: MOTOR	Active: first confirm	QuickComm.: Yes	Max: 10000.00	

Nominal motor current [A] from rating plate - see diagram in P0304.

Index:

- P0305[0] : 1st. Drive data set (DDS)
- P0305[1] : 2nd. Drive data set (DDS)
- P0305[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).
Depends also on P0320 (motor magnetization current).

Note:

The maximum value of P0305 depends on the maximum inverter current r0209 and the motor type:

Asynchronous motor : $p0305_{max, asyn} = 2 \cdot r0209$

Synchronous motor : $p0305_{max, syn} = 2 \cdot r0209$

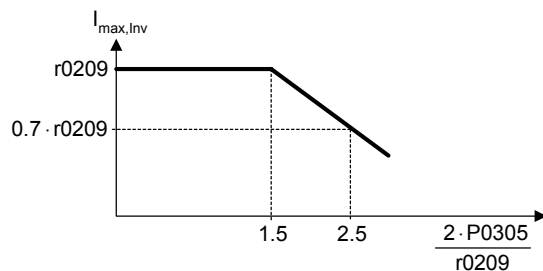
It is recommended that the ratio of P0305 (rated motor current) and r0207 (rated inverter current) should not be lower than:

$$U/f : \frac{1}{8} \leq \frac{P0305}{r0207}$$

$$SLVC \text{ and } VC : \frac{1}{4} \leq \frac{P0305}{r0207}$$

When the relation of the nominal motor current P0305 and half of the maximal inverter current (r0209) exceeds 1,5 an additional current derating is applied.

This is necessary to protect the inverter from harmonic current waves.



Default value is depending on inverter type and its rating data.

P0307[3]	Rated motor power			Min: 0.01	Level 1
	CStat: C	Datatype: Float	Unit: -	Def: 0.75	
	P-Group: MOTOR	Active: first confirm	QuickComm.: Yes	Max: 2000.00	

Nominal motor power [kW/hp] from rating plate.

Index:

- P0307[0] : 1st. Drive data set (DDS)
- P0307[1] : 2nd. Drive data set (DDS)
- P0307[2] : 3rd. Drive data set (DDS)

Dependency:

If P0100 = 1, values will be in [hp] - see diagram P0304 (rating plate).

Changeable only when P0010 = 1 (quick commissioning).

Note:

Default value is depending on inverter type and its rating data.

P0308[3]	Rated motor cosPhi	Min: 0.000	Level 2	
	CStat: C	Datatype: Float		Unit: -
	P-Group: MOTOR	Active: first confirm		QuickComm.: Yes

Nominal motor power factor (cosPhi) from rating plate - see diagram P0304.

Index:

P0308[0] : 1st. Drive data set (DDS)
P0308[1] : 2nd. Drive data set (DDS)
P0308[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Visible only on BOP when P0100 = 0 or 2, (motor power entered in [kW]).
Setting 0 causes internal calculation of value.

P0309[3]	Rated motor efficiency	Min: 0.0	Level 2	
	CStat: C	Datatype: Float		Unit: %
	P-Group: MOTOR	Active: first confirm		QuickComm.: Yes

Nominal motor efficiency in [%] from rating plate.

Index:

P0309[0] : 1st. Drive data set (DDS)
P0309[1] : 2nd. Drive data set (DDS)
P0309[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Visible only on BOP when P0100 = 1, (i.e. motor power entered in [hp]).
Setting 0 causes internal calculation of value.

Note:

P0309 = 100 % corresponds to superconducting.

Details:

See diagram in P0304 (rating plate).

P0310[3]	Rated motor frequency	Min: 12.00	Level 1	
	CStat: C	Datatype: Float		Unit: Hz
	P-Group: MOTOR	Active: first confirm		QuickComm.: Yes

Nominal motor frequency [Hz] from rating plate.

Index:

P0310[0] : 1st. Drive data set (DDS)
P0310[1] : 2nd. Drive data set (DDS)
P0310[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Pole pair number recalculated automatically if parameter is changed.

Details:

See diagram in P0304 (rating plate)

P0311[3]	Rated motor speed	Datatype: U16	Unit: 1/min	Min: 0	Level 1
	CStat: C	Active: first confirm	QuickComm.: Yes	Def: 1395	
	P-Group: MOTOR			Max: 40000	

Nominal motor speed [rpm] from rating plate.

Index:

P0311[0] : 1st. Drive data set (DDS)
P0311[1] : 2nd. Drive data set (DDS)
P0311[2] : 3rd. Drive data set (DDS)

Dependency:

Changeable only when P0010 = 1 (quick commissioning).

Setting 0 causes internal calculation of value.
Required for vector control and V/f control with speed controller.
Slip compensation in V/f control requires rated motor speed for correct operation.

Pole pair number recalculated automatically if parameter is changed.

Note:

Default value is depending on inverter type and its rating data.

Details:

See diagram in P0304 (rating plate)

r0313[3]	Motor pole pairs	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: MOTOR			Def: -	
				Max: -	

Displays number of motor pole pairs that the inverter is currently using for internal calculations.

Index:

P0313[0] : 1st. Drive data set (DDS)
P0313[1] : 2nd. Drive data set (DDS)
P0313[2] : 3rd. Drive data set (DDS)

Value:

r0313 = 1 : 2-pole motor
r0313 = 2 : 4-pole motor
etc.

Dependency:

Recalculated automatically when P0310 (rated motor frequency) or P0311 (rated motor speed) is changed.

$$r0313 = 60 \cdot \frac{p0310}{p0311}$$

P0314[3]	Motor pole pair number	Datatype: U16	Unit: -	Min: 0	Level 4
	CStat: C	Active: first confirm	QuickComm.: Yes	Def: 0	
	P-Group: MOTOR			Max: 99	

Specifies number of pole pairs of motor.

Index:

P0314[0] : 1st. Drive data set (DDS)
P0314[1] : 2nd. Drive data set (DDS)
P0314[2] : 3rd. Drive data set (DDS)

Value:

P0314 = 1 : 2-pole motor
P0314 = 2 : 4-pole motor
etc.

Dependency:

Recalculated automatically when P0310 (rated motor frequency) or P0311 (rated motor speed) is changed.

P0320[3]	Motor magnetizing current	Min: 0.0	Level
CStat: CT	Datatype: Float	Def: 0.0	3
P-Group: MOTOR	Active: Immediately	QuickComm.: Yes	
		Max: 99.0	

Defines motor magnetization current in [%] relative to P0305 (rated motor current).

Index:

P0320[0] : 1st. Drive data set (DDS)
P0320[1] : 2nd. Drive data set (DDS)
P0320[2] : 3rd. Drive data set (DDS)

Dependency:

P0320 = 0:
Setting 0 causes calculation by P0340 = 1 (data entered from rating plate) or by P3900 = 1 - 3 (end of quick commissioning). The calculated value is displayed in parameter r0331.

r0330[3]	Rated motor slip	Min: -	Level
	Datatype: Float	Def: -	3
	Unit: %	Max: -	
P-Group: MOTOR			

Displays nominal motor slip in [%] relative to P0310 (rated motor frequency) and P0311 (rated motor speed).

$$r0330 [\%] = \frac{p0310 - \frac{p0311}{60} \cdot r0313}{p0310} \cdot 100 \%$$

Index:

P0330[0] : 1st. Drive data set (DDS)
P0330[1] : 2nd. Drive data set (DDS)
P0330[2] : 3rd. Drive data set (DDS)

r0331[3]	Rated magnetization current	Min: -	Level
	Datatype: Float	Def: -	3
	Unit: A	Max: -	
P-Group: MOTOR			

Displays calculated magnetizing current of motor in [A].

Index:

P0331[0] : 1st. Drive data set (DDS)
P0331[1] : 2nd. Drive data set (DDS)
P0331[2] : 3rd. Drive data set (DDS)

r0332[3]	Rated power factor	Min: -	Level
	Datatype: Float	Def: -	3
	Unit: -	Max: -	
P-Group: MOTOR			

Displays power factor for motor

Index:

P0332[0] : 1st. Drive data set (DDS)
P0332[1] : 2nd. Drive data set (DDS)
P0332[2] : 3rd. Drive data set (DDS)

Dependency:

Value is calculated internally if P0308 (rated motor cosPhi) set to 0; otherwise, value entered in P0308 is displayed.

r0333[3]	Rated motor torque	Min: -	Level
	Datatype: Float	Def: -	3
	Unit: Nm	Max: -	
P-Group: MOTOR			

Displays rated motor torque.

Index:

P0333[0] : 1st. Drive data set (DDS)
P0333[1] : 2nd. Drive data set (DDS)
P0333[2] : 3rd. Drive data set (DDS)

Dependency:

Value is calculated from P0307 (rated motor power) and P0311 (rated motor speed).

$$r0333 [\text{Nm}] = \frac{p0307 [\text{kW}] \cdot 1000}{\frac{p0311 [1/\text{min}]}{60} \cdot 2 \pi}$$

P0335[3]	Motor cooling			Min: 0	Level 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: MOTOR	Active: first confirm	QuickComm.: Yes	Max: 3	

Selects motor cooling system used.

Possible Settings:

- 0 Self-cooled
- 1 Force-cooled
- 2 Self-cooled and internal fan
- 3 Force-cooled and internal fan

Index:

- P0335[0] : 1st. Drive data set (DDS)
- P0335[1] : 2nd. Drive data set (DDS)
- P0335[2] : 3rd. Drive data set (DDS)

P0340[3]	Calculation of motor parameters				Min: 0	Level 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: MOTOR	Active: first confirm	QuickComm.: No	Max: 4		

Calculates various motor parameters (see table below):

	P0340 = 1	P0340 = 2	P0340 = 3	P0340 = 4
P0341[3] Motor inertia [kg*m^2]	x			
P0342[3] Total/motor inertia ratio	x			
P0344[3] Motor weight	x			
P0346[3] Magnetization time	x		x	
P0347[3] Demagnetization time	x		x	
P0350[3] Stator resistance (line-to-line)	x	x		
P0352[3] Cable resistance	x	x		
P0354[3] Rotor resistance	x	x		
P0356[3] Stator leakage inductance	x	x		
P0358[3] Rotor leakage inductance	x	x		
P0360[3] Main inductance	x	x		
P0362[3] Magnetizing curve flux 1	x	x		
P0363[3] Magnetizing curve flux 2	x	x		
P0364[3] Magnetizing curve flux 3	x	x		
P0365[3] Magnetizing curve flux 4	x	x		
P0366[3] Magnetizing curve imag 1	x	x		
P0367[3] Magnetizing curve imag 2	x	x		
P0368[3] Magnetizing curve imag 3	x	x		
P0369[3] Magnetizing curve imag 4	x	x		
P0625[3] Ambient motor temperature	x	x		
P1316[3] Boost end frequency	x		x	
P1460[3] Gain speed controller	x		x	x
P1462[3] Integral time speed controller	x		x	x
P1470[3] Gain speed controller (SLVC)	x		x	x
P1472[3] Integral time n-ctrl. (SLVC)	x		x	x
P1520[3] CO: Upper torque limit	x			
P1521[3] CO: Lower torque limit	x			
P1530[3] Motoring power limitation	x			
P1531[3] Regenerative power limitation	x			
P1715[3] Gain current controller	x		x	x
P1717[3] Integral time current controller	x		x	x
P1764[3] Kp of n-adaption (SLVC)	x		x	x
P1767[3] Tn of n-adaption (SLVC)	x		x	x
P2000[3] Reference frequency	x			
P2002[3] Reference current	x			
P2003[3] Reference torque	x			
P2174[3] Torque threshold M_thresh	x			
P2185[3] Upper torque threshold 1	x			
P2186[3] Lower torque threshold 1	x			
P2187[3] Upper torque threshold 2	x			
P2188[3] Lower torque threshold 2	x			
P2189[3] Upper torque threshold 3	x			
P2190[3] Lower torque threshold 3	x			

Possible Settings:

- 0 No calculation
- 1 Complete parameterization
- 2 Calc. equivalent circuit data
- 3 Calc. V/f and vector control
- 4 Calc. only controller setting

Index:

- P0340[0] : 1st. Drive data set (DDS)
- P0340[1] : 2nd. Drive data set (DDS)
- P0340[2] : 3rd. Drive data set (DDS)

Note:

This parameter is required during commissioning to optimize inverter performance. If there is a large mismatch in Power ratings of Inverter to Motor it is possible that r0384 and r0386 may not be calculated correct. In these cases use P1910.

When transferring parameter p0340, ET 200S FC uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations.

This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):

- Parameter fault 30
- Drive fault 70
- Drive fault 75

When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.

The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

P0341[3]	Motor inertia [kg*m^2]	Min: 0.00010	Level 3	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: MOTOR	Active: Immediately		QuickComm.: No
		Def: 0.00180		
		Max: 1000.00000		

Sets no-load inertia of motor.

Together with P0342 (inertia ratio total/motor) and P1496 (scaling factor acceleration), this value produces the acceleration torque (r1517), which can be added to any additional torque produced from a BICO source (P1511), and incorporated in the torque control function.

Index:

- P0341[0] : 1st. Drive data set (DDS)
- P0341[1] : 2nd. Drive data set (DDS)
- P0341[2] : 3rd. Drive data set (DDS)

Note:

The result of P0341 * P0342 is included in the speed controller calculation.
P0341 * P0342 (inertia ratio total/motor) = total motor inertia

P1496 (scaling factor acceleration) = 100 % activates acceleration pre-control for the speed controller and calculates the torque from P0341 (motor inertia) and P0342 (inertia ratio total/motor).

P0342[3]	Total/motor inertia ratio	Min: 1.000	Level 3	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: MOTOR	Active: Immediately		QuickComm.: No
		Def: 1.000		
		Max: 400.000		

Specifies ratio between total inertia (load + motor) and motor inertia.

Index:

- P0342[0] : 1st. Drive data set (DDS)
- P0342[1] : 2nd. Drive data set (DDS)
- P0342[2] : 3rd. Drive data set (DDS)

P0344[3]	Motor weight			Min: 1.0	Level 3
	CStat: CUT	Datatype: Float	Unit: kg	Def: 9.4	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Max: 6500.0	

Specifies motor weight [kg].

Index:

P0344[0] : 1st. Drive data set (DDS)
P0344[1] : 2nd. Drive data set (DDS)
P0344[2] : 3rd. Drive data set (DDS)

Note:

This value is used in the motor thermal model.

It is normally calculated automatically from P0340 (motor parameters) but can also be entered manually.

Default value is depending on inverter type and its rating data.

r0345[3]	Motor start-up time			Min: -	Level 3
		Datatype: Float	Unit: s	Def: -	
	P-Group: MOTOR			Max: -	

Displays motor start-up time.

This time corresponds to the standardized motor inertia.

The start-up time is the time taken to reach rated motor speed from standstill at acceleration with rated motor torque (r0333).

Index:

P0345[0] : 1st. Drive data set (DDS)
P0345[1] : 2nd. Drive data set (DDS)
P0345[2] : 3rd. Drive data set (DDS)

P0346[3]	Magnetization time			Min: 0.000	Level 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 1.000	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Max: 20.000	

Sets magnetization time [s], i.e. waiting time between pulse enable and start of ramp-up.
Motor magnetization builds up during this time.

Magnetization time is normally calculated automatically from the motor data and corresponds to the rotor time constant.

Index:

P0346[0] : 1st. Drive data set (DDS)
P0346[1] : 2nd. Drive data set (DDS)
P0346[2] : 3rd. Drive data set (DDS)

Notice:

An excessive reduction of this time can result in insufficient motor magnetization.

Note:

If boost settings are higher than 100 %, magnetization time may be reduced.

Default value is depending on inverter type and its rating data.

P0347[3]	Demagnetization time			Min: 0.000	Level 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 1.000	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Max: 20.000	

Changes time allowed after OFF2 / fault condition, before pulses can be re-enabled.

Index:

P0347[0] : 1st. Drive data set (DDS)
P0347[1] : 2nd. Drive data set (DDS)
P0347[2] : 3rd. Drive data set (DDS)

Notice:

Not active following a normally completed ramp-down, e.g. after OFF1, OFF3 or JOG.

Note:

Overcurrent trips will occur if the time is decreased excessively.

The demagnetization time is approximately 2.5 x rotor time constant in seconds.
Default value is depending on inverter type and its rating data.

P0350[3]	Stator resistance (line-to-line)				Level 2
	CStat: CUT	Datatype: Float	Unit: Ohm	Min: 0.00001	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Def: 4.00000 Max: 2000.00000	

Stator resistance value in [Ohms] for connected motor (from line-to-line).

The parameter value includes the cable resistance.

There are three ways to determine the value for this parameter:

1. Calculate using
 - P0340 = 1 (data entered from rating plate) or
 - P0010 = 1, P3900 = 1,2 or 3 (end of quick commissioning).
2. Measure using P1910 = 1 (motor data identification - value for stator resistance is overwritten).
3. Measure manually using an Ohmmeter.

Index:

P0350[0] : 1st. Drive data set (DDS)
 P0350[1] : 2nd. Drive data set (DDS)
 P0350[2] : 3rd. Drive data set (DDS)

Note:

Since measured line-to-line, this value may appear to be higher (up to 2 times higher) than expected.

The value entered in P0350 (stator resistance) is the one obtained by the method last used.

Default value is depending on inverter type and its rating data.

P0352[3]	Cable resistance				Level 3
	CStat: CUT	Datatype: Float	Unit: Ohm	Min: 0.0	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Def: 0.0 Max: 120.0	

Describes cable resistance between inverter and motor for one phase.

The value corresponds to the resistance of the cable between the inverter and the motor, relative to the rated impedance.

Index:

P0352[0] : 1st. Drive data set (DDS)
 P0352[1] : 2nd. Drive data set (DDS)
 P0352[2] : 3rd. Drive data set (DDS)

P0354[3]	Rotor resistance				Level 4
	CStat: CUT	Datatype: Float	Unit: Ohm	Min: 0.0	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Def: 10.0 Max: 300.0	

Sets rotor resistance of motor equivalent circuit (phase value).

Index:

P0354[0] : 1st. Drive data set (DDS)
 P0354[1] : 2nd. Drive data set (DDS)
 P0354[2] : 3rd. Drive data set (DDS)

Dependency:

Calculated automatically using the motor model or determined using P1910 (motor identification).

P0356[3]	Stator leakage inductance				Level 4
	CStat: CUT	Datatype: Float	Unit: -	Min: 0.00001	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Def: 10.00000 Max: 1000.00000	

Sets stator leakage inductance [mH] of motor equivalent circuit (phase value).

Index:

P0356[0] : 1st. Drive data set (DDS)
 P0356[1] : 2nd. Drive data set (DDS)
 P0356[2] : 3rd. Drive data set (DDS)

Dependency:

Calculated automatically using the motor model or determined using P1910 (motor identification).

P0358[3]	Rotor leakage inductance	Min: 0.0	Level
CStat: CUT	Datatype: Float	Def: 10.0	4
P-Group: MOTOR	Active: Immediately	QuickComm.: No	
		Max: 1000.0	

Sets rotor leakage inductance [mH] of motor equivalent circuit (phase value).

Index:

- P0358[0] : 1st. Drive data set (DDS)
- P0358[1] : 2nd. Drive data set (DDS)
- P0358[2] : 3rd. Drive data set (DDS)

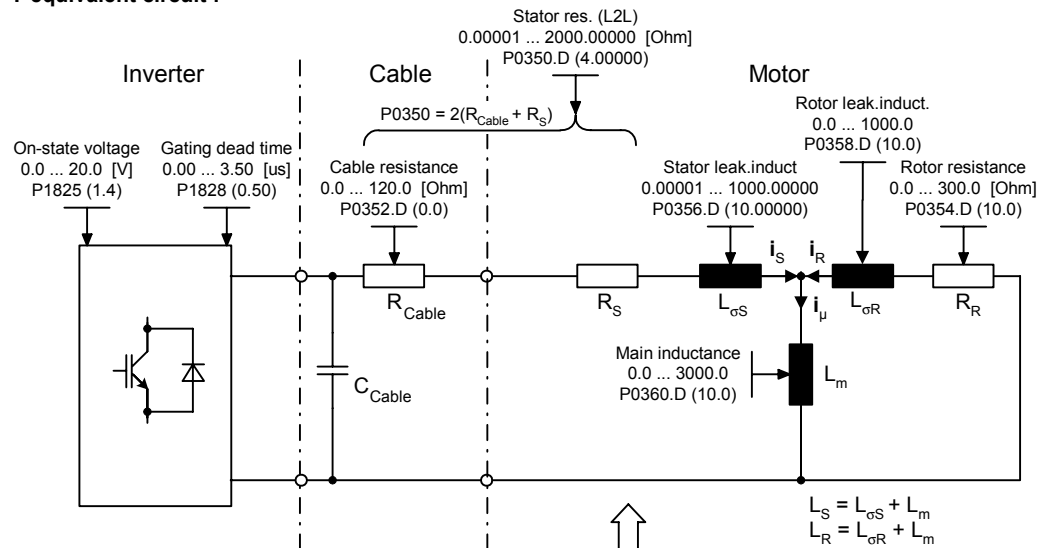
Dependency:

Calculated automatically using the motor model or determined using P1910 (motor identification).

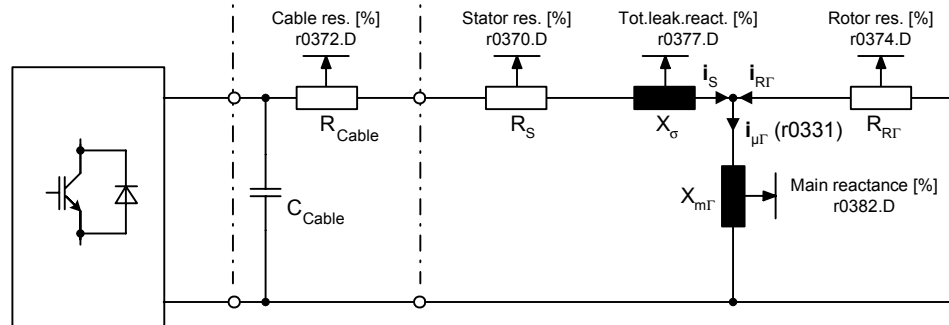
P0360[3]	Main inductance	Min: 0.0	Level
CStat: CUT	Datatype: Float	Def: 10.0	4
P-Group: MOTOR	Active: Immediately	QuickComm.: No	
		Max: 10000.0	

Sets main inductance [mH] of the motor equivalent circuit (phase value), see diagram below.

T-equivalent circuit :



Invers - Γ -equivalent circuit:



Index:

- P0360[0] : 1st. Drive data set (DDS)
- P0360[1] : 2nd. Drive data set (DDS)
- P0360[2] : 3rd. Drive data set (DDS)

Dependency:

Calculated automatically using the motor model or determined using P1910 (motor identification).



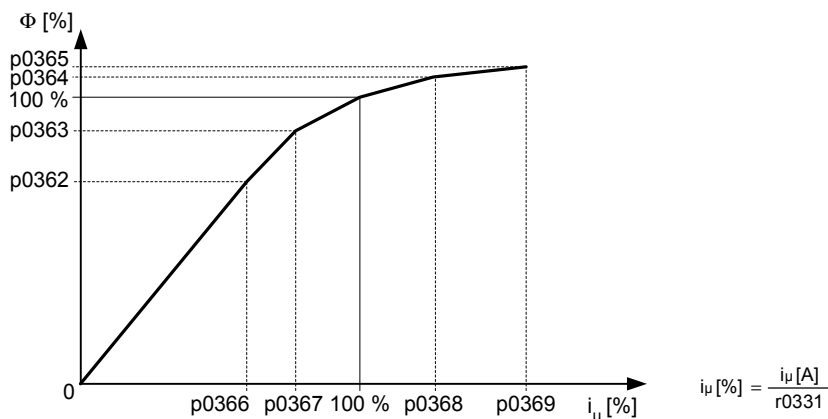
Caution:

The data of equivalent circuit relates to the star equivalent circuit. Any data of the delta equivalent circuit available, therefore must be transformed to the star equivalent circuit before entering into the inverter.

P0362[3]	Magnetizing curve flux 1			Min: 0.0	Level 4
	CStat: CUT	Datatype: Float	Unit: %	Def: 60.0	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Max: 300.0	

Specifies first flux value of saturation characteristic in [%] relative to rated motor voltage (P0304).

The parameter settings for the values of P0362 to P0365 respectively P0366 to P0369 are illustrated in the diagram below.



Index:

- P0362[0] : 1st. Drive data set (DDS)
- P0362[1] : 2nd. Drive data set (DDS)
- P0362[2] : 3rd. Drive data set (DDS)

Notice:

The value belongs to the first magnetizing current value and must be smaller than or equal to magnetizing curve flux 2 (P0363).

If the magnetization values entered in P0362 to P0365 respectively P0366 to P0369 do not match the conditions (see below), a linear characteristic is applied internally.

$$P0365 \geq P0364 \geq P0363 \geq P0362$$

$$P0369 \geq P0368 \geq P0367 \geq P0366$$

Note:

P0362 = 100 % corresponds to rated motor flux

Rated flux = rated EMF

P0363[3]	Magnetizing curve flux 2			Min: 0.0	Level 4
	CStat: CUT	Datatype: Float	Unit: %	Def: 85.0	
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Max: 300.0	

Specifies second flux value of saturation characteristic in [%] relative to rated motor voltage (P0304).

Index:

- P0363[0] : 1st. Drive data set (DDS)
- P0363[1] : 2nd. Drive data set (DDS)
- P0363[2] : 3rd. Drive data set (DDS)

Notice:

The value belongs to the second magnetizing current value and must be smaller than or equal to magnetizing curve flux 3 (P0364) and greater than or equal to magnetizing curve flux 1 (P0362).

Note:

P0363 = 100 % corresponds to rated motor flux

Rated flux = rated EMF

Details:

See P0362 (magnetizing curve flux 1).

P0364[3]	Magnetizing curve flux 3	Min: 0.0	Level 4	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: MOTOR	Active: Immediately		QuickComm.: No

Specifies third flux value of saturation characteristic in [%] relative to rated motor voltage (P0304).

Index:

P0364[0] : 1st. Drive data set (DDS)
P0364[1] : 2nd. Drive data set (DDS)
P0364[2] : 3rd. Drive data set (DDS)

Notice:

The value belongs to the third magnetizing current value and must be smaller than or equal to magnetizing curve flux 4 (P0365) and greater than or equal to magnetizing curve flux 2 (P0363).

Note:

P0364 = 100 % corresponds to rated motor flux

Rated flux = rated EMF

Details:

See P0362 (magnetizing curve flux 1).

P0365[3]	Magnetizing curve flux 4	Min: 0.0	Level 4	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: MOTOR	Active: Immediately		QuickComm.: No

Specifies fourth flux value of saturation characteristic in [%] relative to rated motor voltage (P0304).

Index:

P0365[0] : 1st. Drive data set (DDS)
P0365[1] : 2nd. Drive data set (DDS)
P0365[2] : 3rd. Drive data set (DDS)

Notice:

The value belongs to the third magnetizing current value and must be greater than or equal to magnetizing curve flux 3 (P0364).

Note:

P0365 = 100 % corresponds to rated motor flux

Rated flux = rated EMF

Details:

See P0362 (magnetizing curve flux 1).

P0366[3]	Magnetizing curve imag 1	Min: 0.0	Level 4	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: MOTOR	Active: Immediately		QuickComm.: No

Specifies first magnetizing current value of the saturation characteristic in [%] relative to the rated magnetizing current (P0331).

Index:

P0366[0] : 1st. Drive data set (DDS)
P0366[1] : 2nd. Drive data set (DDS)
P0366[2] : 3rd. Drive data set (DDS)

Notice:

The value belongs to the first flux value and must be less than or equal to magnetizing curve imag 2 (P0367).

Dependency:

Affects P0320 (motor magnetizing current).

Details:

See P0362 (magnetizing curve flux 1).

P0367[3]	Magnetizing curve imag 2	Min: 0.0	Level 4	
	CStat: CUT	Datatype: Float		Def: 75.0
	P-Group: MOTOR	Active: Immediately		QuickComm.: No Max: 500.0

Specifies second magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331).

Index:

P0367[0] : 1st. Drive data set (DDS)
P0367[1] : 2nd. Drive data set (DDS)
P0367[2] : 3rd. Drive data set (DDS)

Notice:

The value belongs to the second flux value and must be less than or equal to magnetizing curve imag 3 (P0368) and greater than or equal to magnetizing curve imag 1 (P0366).

Dependency:

Affects P0320 (motor magnetizing current).

Details:

See P0362 (magnetizing curve flux 1).

P0368[3]	Magnetizing curve imag 3	Min: 0.0	Level 4	
	CStat: CUT	Datatype: Float		Def: 135.0
	P-Group: MOTOR	Active: Immediately		QuickComm.: No Max: 500.0

Specifies third magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331).

Index:

P0368[0] : 1st. Drive data set (DDS)
P0368[1] : 2nd. Drive data set (DDS)
P0368[2] : 3rd. Drive data set (DDS)

Notice:

The value belongs to the third flux value and must be less than or equal to magnetizing curve imag 4 (P0369) and greater than or equal to magnetizing curve imag 2 (P0367).

Dependency:

Affects P0320 (motor magnetizing current).

Details:

See P0362 (magnetizing curve flux 1).

P0369[3]	Magnetizing curve imag 4	Min: 0.0	Level 4	
	CStat: CUT	Datatype: Float		Def: 170.0
	P-Group: MOTOR	Active: Immediately		QuickComm.: No Max: 500.0

Specifies fourth magnetizing current value of saturation characteristic in [%] relative to rated magnetizing current (P0331).

Index:

P0369[0] : 1st. Drive data set (DDS)
P0369[1] : 2nd. Drive data set (DDS)
P0369[2] : 3rd. Drive data set (DDS)

Notice:

The value belongs to the third flux value and must be less than or equal to magnetizing curve imag 3 (P0368).

Dependency:

Affects P0320 (motor magnetizing current).

Details:

See P0362 (magnetizing curve flux 1).

r0370[3]	Stator resistance [%]	Datatype: Float	Unit: %	Level 4
	P-Group: MOTOR	Min: -	Def: -	
		Max: -		

Displays standardized stator resistance of motor equivalent circuit (phase value) in [%].

Index:

P0370[0] : 1st. Drive data set (DDS)
P0370[1] : 2nd. Drive data set (DDS)
P0370[2] : 3rd. Drive data set (DDS)

Note:

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

r0372[3]	Cable resistance [%]	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
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P-Group: MOTOR

Displays standardized cable resistance of motor equivalent circuit (phase value) in [%].
It is estimated to be 20 % of the stator resistance.

Index:

P0372[0] : 1st. Drive data set (DDS)
P0372[1] : 2nd. Drive data set (DDS)
P0372[2] : 3rd. Drive data set (DDS)

Note:

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

r0373[3]	Rated stator resistance [%]	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
-----------------	------------------------------------	------------------------	----------------	---	--------------------------

P-Group: MOTOR

Displays rated stator resistance of the motor equivalent circuit (phase value) in [%].

Index:

P0373[0] : 1st. Drive data set (DDS)
P0373[1] : 2nd. Drive data set (DDS)
P0373[2] : 3rd. Drive data set (DDS)

Note:

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

r0374[3]	Rotor resistance [%]	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
-----------------	-----------------------------	------------------------	----------------	---	--------------------------

P-Group: MOTOR

Displays standardized rotor resistance of the motor equivalent circuit (phase value) in [%].

Index:

P0374[0] : 1st. Drive data set (DDS)
P0374[1] : 2nd. Drive data set (DDS)
P0374[2] : 3rd. Drive data set (DDS)

Note:

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

r0376[3]	Rated rotor resistance [%]	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
-----------------	-----------------------------------	------------------------	----------------	---	--------------------------

P-Group: MOTOR

Displays rated rotor resistance of the motor equivalent circuit (phase value) in [%].

Index:

P0376[0] : 1st. Drive data set (DDS)
P0376[1] : 2nd. Drive data set (DDS)
P0376[2] : 3rd. Drive data set (DDS)

Note:

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

r0377[3]	Total leakage reactance [%]	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
	P-Group: MOTOR				
	Displays standardized total leakage reactance of the motor equivalent circuit (phase value) in [%].				
Index:	P0377[0] : 1st. Drive data set (DDS) P0377[1] : 2nd. Drive data set (DDS) P0377[2] : 3rd. Drive data set (DDS)				
Note:	Rated motor impedance: $Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$				
r0382[3]	Main reactance [%]	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
	P-Group: MOTOR				
	Displays standardized main reactance of the motor equivalent circuit (phase value) in [%].				
Index:	P0382[0] : 1st. Drive data set (DDS) P0382[1] : 2nd. Drive data set (DDS) P0382[2] : 3rd. Drive data set (DDS)				
Note:	Rated motor impedance: $Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$				
r0384[3]	Rotor time constant	Datatype: Float	Unit: ms	Min: - Def: - Max: -	Level 3
	P-Group: MOTOR				
	Displays calculated rotor time constant [ms].				
Index:	P0384[0] : 1st. Drive data set (DDS) P0384[1] : 2nd. Drive data set (DDS) P0384[2] : 3rd. Drive data set (DDS)				
r0386[3]	Total leakage time constant	Datatype: Float	Unit: ms	Min: - Def: - Max: -	Level 4
	P-Group: MOTOR				
	Displays total leakage time constant of motor.				
Index:	P0386[0] : 1st. Drive data set (DDS) P0386[1] : 2nd. Drive data set (DDS) P0386[2] : 3rd. Drive data set (DDS)				
r0394	CO: Stator resistance IGBT [%]	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 4
	P-Group: MOTOR				
	Displays stator resistance calculated in [%] from IGBT ON voltage and current amplitude.				
Note:	Rated motor impedance: $Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$				

r0395	CO: Total stator resistance [%]	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: MOTOR			Def: - Max: -	

Displays stator resistance of motor as [%] of combined stator/cable resistance.

Note:

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

r0396	CO: Act. rotor resistance	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: MOTOR			Def: - Max: -	

Displays (adapted) rotor resistance of the motor equivalent circuit (phase value) in [%].

Notice:

Values greater than 25 % tend to produce excessive motor slip.
Check rated motor speed [rpm] value (P0311).

Note:

Rated motor impedance:

$$Z_N = \frac{V_{ph}}{I_{ph}} = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

P0400[3]	Select encoder type	Datatype: U16	Unit: -	Min: 0	Level 2
	CStat: CT	Active: Immediately	QuickComm.: No	Def: 0 Max: 12	

Selects encoder type (number of encoder channels).

Possible Settings:

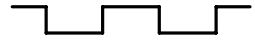
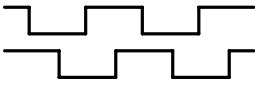
- 0 Disabled
- 1 Single channel encoder
- 2 Quadrature encoder no zero pulse
- 12 Quadrature encoder & zero pulse

Index:

- P0400[0] : 1st. Drive data set (DDS)
- P0400[1] : 2nd. Drive data set (DDS)
- P0400[2] : 3rd. Drive data set (DDS)

Dependency:

Following table displays the setting of P0400 which depends upon the number of encoder channels:

Parameter	Terminal	Track	Encoder output
p0400 = 1	A		single ended
p0400 = 2	A		single ended
	B		

Note:

Encoders with zero pulse can also be connected, but the zero pulse is not used.

The term "quadrature" in setting 2 refers to two periodic functions separated by a quarter cycle or 90 degrees.

If the Encoder is enabled (P400 > 0) and the Motor Holding Brake is enabled (P1215 > 0), then in order to stop encoder loss trips when the brake is applied, then

- The delay speed loss reaction should be > brake holding times (i.e. P494 > P1216 and P494 > P1217)
- The delay time for motor pulled out should be > brake holding times (i.e. P2178 > P1216 and P2178 > P1217)
- The Allowed Speed Difference P492 should be > Fmin P1080



Caution:

When using Vector Control with encoder-feedback , the direction of rotation of the Encoder and Motor must be the same.

If this is not achieved, then the functional operation of the Vector Control will not be guaranteed (positive instead of negative feedback).

Extreme care must therefore be taken with respect to the connection of the motor to the inverter as well as the correct connection of the encoder to the Encoder module. Motor and Encoder must not be incorrectly wired up !

When commissioning Vector Control with encoder-feedback (VC), the drive should be configured for V/f mode (see P1300) first.

Run the drive and compare r0061 with r0021 that should agree in

- sign and
- magnitude (with a deviation of only a few percent).

Only if both criteria are fulfilled, change P1300 and select VC (P1300 = 21 or 23).

P0400 = 1 (single channel encoder) will only allow operation in one direction.

If operation in both directions is required, connect an encoder with 2 channels (A and B) and select setting 2.

Zur Änderung der Drehrichtung mit einem einspurigen Impulsgeber (P0400 = 1) kann der Drehzahlwert über p0410=1 invertiert werden.

See the Operating Instructions for more information.

r0403	CO/BO: Encoder status word			Min: -	Level 2
		Datatype: U16	Unit: -	Def: -	
	P-Group: COMMANDS			Max: -	

Displays status word of encoder (in bit format).

Bitfields:

Bit00	Encoder module active	0	No	1	Yes
Bit01	Encoder error	0	No	1	Yes
Bit02	Signal o.k.	0	No	1	Yes
Bit03	Encoder Low Speed Loss	0	No	1	Yes
Bit04	using one encoder pulse edge	0	No	1	Yes

Details:

The 7-segment display of the bit-parameters (binary parameters) is explained in the Introduction of the Parameter List.

P0405[3]	Enables selection of various pu			Min: 0	Level 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: INVERTER	Active: Immediately	QuickComm.: No	Max: 511	

Enables selection of various pulse types. Only bits 04 and 05 are used for Sinamics G120/ET200s.

Index:

- P0405[0] : 1st. Drive data set (DDS)
- P0405[1] : 2nd. Drive data set (DDS)
- P0405[2] : 3rd. Drive data set (DDS)

Bitfields:

Bit00	not used	0	No	1	Yes
Bit01	not used	0	No	1	Yes
Bit02	not used	0	No	1	Yes
Bit03	not used	0	No	1	Yes
Bit04	invert Z-pulse	0	No	1	Yes
Bit05	Z-pulse = Z & A & B	0	No	1	Yes
Bit06	not used	0	No	1	Yes
Bit07	not used	0	No	1	Yes
Bit08	not used	0	No	1	Yes

P0408[3]	Encoder pulses per revolution	Min: 2	Level
CStat: CT	Datatype: U16	Def: 1024	2
P-Group: ENCODER	Active: Immediately	QuickComm.: No	
		Max: 20000	

Specifies the number of encoder pulses per revolution.

Index:

P0408[0] : 1st. Drive data set (DDS)
P0408[1] : 2nd. Drive data set (DDS)
P0408[2] : 3rd. Drive data set (DDS)

Note:

The encoder resolution (pulses per revolution P0408) which may be entered will be limited by the max. pulse frequency of the encoder circuits ($f_{max} = 300$ kHz).

The following equation calculates the encoder frequency depending on the encoder resolution and the rotational speed (rpm).

The encoder frequency has to be less than the max. pulse frequency:

$$f_{max} > f = \frac{p0408 \times rpm}{60}$$

P0410[3]	Reverses internal direction sen	Min: 0	Level
CStat: CT	Datatype: U16	Def: 0	2
P-Group: ENCODER	Active: Immediately	QuickComm.: No	
		Max: 1	

Reverses internal direction sense of the encoder signal. This does the same thing as switching the ENC_A and ENC_B signals.

Possible Settings:

0 Encoder Normal Rotation
1 Encoder Reverse Rotation

Index:

P0410[0] : 1st. Drive data set (DDS)
P0410[1] : 2nd. Drive data set (DDS)
P0410[2] : 3rd. Drive data set (DDS)

P0491[3]	Reaction on speed signal loss	Min: 0	Level
CStat: CT	Datatype: U16	Def: 0	2
P-Group: ENCODER	Active: first confirm	QuickComm.: No	
		Max: 1	

Selects reaction on loss of speed signal.

Possible Settings:

0 Trip the drive.
1 Warn and SLVC.

Index:

P0491[0] : 1st. Drive data set (DDS)
P0491[1] : 2nd. Drive data set (DDS)
P0491[2] : 3rd. Drive data set (DDS)

P0492[3]	Allowed speed difference	Min: 0.00	Level
CStat: CT	Datatype: Float	Def: 10.00	2
P-Group: ENCODER	Active: Immediately	QuickComm.: No	
		Max: 100.00	

Parameter P0492 is used for low and high speed encoder loss detection (fault: F0090).

- High speed encoder loss detection:
This condition occurs when the allowed frequency and the allowed difference of the speed signals between samples, set in P0492 is exceeded.
 $P0492 \text{ and } f(t_2) - f(t_1) > P0492$
- Low speed encoder loss detection:
This condition occurs when the actual frequency is $< P0492$ when encoder loss occurs.

Condition 1:

- r0061 = 0 and torque limit and then
- r0061 = 0 with setpoint frequency > 0 for time > P0494

Condition 2):

- Act. freq. < P0492 and $f(t_2) < P0492$ and ASIC detect channel B loss

Dependency:

This parameter is updated when motor start-up time P0345 is changed or when a speedloop optimisation is performed (P1960 = 1).

There is a fixed delay of 40 ms before acting upon loss of encoder at high speeds.

Note:

If the Encoder is enabled (P400 > 0) and the Motor Holding Brake is enabled (P1215 > 0) then in order to stop encoder loss trips when the brake is applied, then the allowed Speed Difference P492 should be > Fmin P1080



Caution:

P0492 = 0 (disabled):

When allowed speed difference is set to 0, both the high speed and low speed encoder loss detection is disabled, thus encoder loss will not be detected.

If encoder loss detection is disabled and encoder loss occurs, then operation of the motor may become unstable.

P0494[3]	Delay speed loss reaction				Min: 0	Level 2
	CStat: CUT	Datatype: U16	Unit: ms	Def: 10		
	P-Group: ENCODER	Active: first confirm	QuickComm.: No	Max: 65000		

Used for low speed encoder loss detection.

If the motor shaft speed is less than the value in P0492 then encoder loss is detected using a low speed encoder loss detection algorithm.

This parameter selects the delay between loss of encoder at low speed and reaction to the encoder loss.

Index:

- P0494[0] : 1st. Drive data set (DDS)
- P0494[1] : 2nd. Drive data set (DDS)
- P0494[2] : 3rd. Drive data set (DDS)

Dependency:

This parameter is updated when motor start-up time P0345 is changed or when a speedloop optimisation is performed (P1960 = 1).

Note:

If the Encoder is enabled (P400 > 0) and the Motor Holding Brake is enabled (P1215 > 0), then in order to stop encoder loss trips when the brake is applied, then the delay speed loss reaction should be > brake holding times (i.e. P494 > P1216 and P494 > P1217)



Caution:

P0494 = 0 (disabled):

When the delay in P0494 is set to 0, then low speed encoder loss detection is disabled and low speed encoder loss cannot be detected (high speed encoder loss detection will still operate if P0492 > 0).

If low speed encoder loss detection is disabled and encoder should be lost at low speed, then operation of motor may become unstable.

P0500[3]	Technological application				Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: QUICK	Active: first confirm	QuickComm.: Yes	Max: 3		

Selects technological application.

Sets control mode (P1300).

Possible Settings:

- 0 Constant torque
- 3 Simple Positioning

Index:

- P0500[0] : 1st. Drive data set (DDS)
- P0500[1] : 2nd. Drive data set (DDS)
- P0500[2] : 3rd. Drive data set (DDS)

P0601[3]	Motor temperature sensor	Min: 0	Level
CStat: CUT	Datatype: U16	Def: 0	2
P-Group: MOTOR	Active: first confirm	QuickComm.: No	
		Max: 2	

Selects motor temperature sensor.

Possible Settings:

- 0 No sensor
- 1 PTC thermistor
- 2 KTY84

Index:

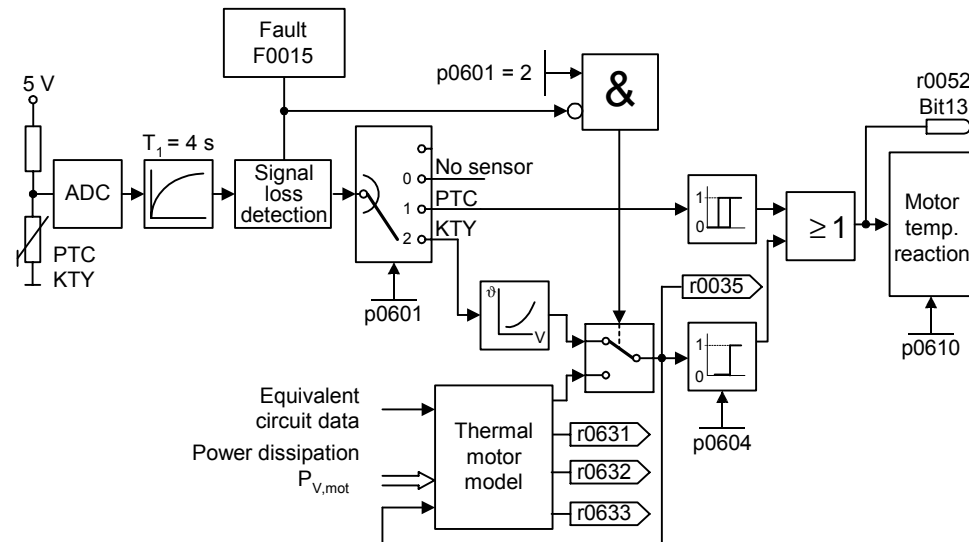
- P0601[0] : 1st. Drive data set (DDS)
- P0601[1] : 2nd. Drive data set (DDS)
- P0601[2] : 3rd. Drive data set (DDS)

Dependency:

if "no sensor" is selected, the motor temperature monitoring will be done based on the estimated value of the thermal motor model.

When a thermal sensor is connected, the temperature of the motor is additionally calculated using the thermal motor model.

- When a KTY sensor is fitted, in case of loss of connection, F0015 occurs and the motor temperature monitoring is automatically switched to the thermal motor model. That means, after powercycle, temperature monitoring according to the thermal motor model is active.
- Using a PTC sensor the temperature of the motor is calculated by the sensor in conjunction with the thermal model. This allows for redundancy of the monitoring process.



PTC sensor:

A PTC temperature sensor (Positive-Temperature-Characteristic) is a resistor with a positive temperature characteristic which, at normal temperatures, has a low resistance value (50-100 Ohm). Normally, three PTC temperature sensors are connected in series in the motor (depending on the motor manufacturer), thus producing a "cold resistance value" ranging from 150 to 300 Ohm. PTC temperature sensors are also frequently referred to as cold conductors.

However, at a certain threshold temperature, the resistance rises rapidly. The threshold temperature is selected by the motor manufacturer in such a way that it corresponds to the nominal temperature value of the motor insulation. This allows the change in the resistance value to be deployed to protect the motor, as the PTCs are embedded in the motor windings. PTC temperature sensors are not suitable for measuring temperature.

When the PTC is connected to the PTC/KTY84 Interface of the ICU24(F) and the selection motor temperature sensor has been activated by the setting P0601 = 1 (PTC sensor), then the inverter protects the motor.

Should the resistance value of 2000 Ohm be exceeded, the inverter displays error F0011 (motor overheating).

If the resistance value is below 100 Ohm, the error F0015 (no motor temperature signal) is then output.

This protects the motor from overheating and also from a sensor wire breakage.

The motor is additionally monitored by the thermal motor model in the inverter, thus providing a redundant system for monitoring the motor.

KTY84 sensor:

The sensor KTY84 is basically a semi-conductor thermo-sensor (diode), the resistance value of which varies from some 500 Ohm at 0 °C to 2600 Ohm at 300 °C.

It has a positive temperature coefficient and, in contrast to the PTCs, has an almost linear temperature characteristic.

The resistor behaviour is comparable to that of a measuring resistor with a very high temperature coefficient.

Note the following when connecting the polarity.

Connect the sensor so that the diode is polarized in the operative direction.

That means that the anode needs to be connected to terminal 14 = PTC A (+) and the cathode to terminal 15 = PTC B (-).

If the temperature monitoring function is activated with the setting P0601 = 2, the temperature of the sensor (thus that of the motor windings) is then written to parameter r0035.

The motor overheating warning threshold needs to be assigned with parameter P0604 (the works setting is 130 °C).

This warning threshold depends on the motor's thermal class (see table below).

Extract of IEC 85	
Insulation class	End temperature
Y	90 °C
A	105 °C
E	120 °C
B	130 °C
F	155 °C
H	180 °C

The motor overheating disturbance threshold is automatically set by the inverter at 10 % higher than the temperature declared in parameter P0604.

Connection failure or short circuit:

If the electric circuit to the sensor KTY84 is open or if a short circuit occurs, error F0015 (no motor temperature signal) is then displayed.

P0604[3]	Threshold motor temperature				Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: °C	Def: 130.0		
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Max: 200.0		

Enters warning threshold for motor temperature protection.

The trip temperature defined always 10 % higher than the warning level P0604.

When act. motor temperature exceeds trip temperature than inverter trip as defined in P0610.

$$t_{\text{trip}} = 1.1 \cdot t_{\text{warn}} = 1.1 \cdot p0604 \quad \begin{array}{l} t_{\text{warn}} : \text{Warning threshold (p0604)} \\ t_{\text{trip}} : \text{Trip threshold (max. permissible temperature)} \end{array}$$

Index:

P0604[0] : 1st. Drive data set (DDS)

P0604[1] : 2nd. Drive data set (DDS)

P0604[2] : 3rd. Drive data set (DDS)

Dependency:

This value should be at least 40°C higher than the motor ambient temperature P0625.

$$p0604 \geq p0625 + 40 \text{ °C}$$

Note:

Default value depends on P0300 (select motor type).

P0610[3]	Motor I2t temperature reaction			Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 2	
	P-Group: MOTOR	Active: first confirm	QuickComm.: No	Max: 2	

Defines reaction when motor temperature reaches warning threshold.

Possible Settings:

- 0 No reaction, warning only
- 1 Warning and I_{max} reduction
- 2 Warning and trip (F0011)

Index:

- P0610[0] : 1st. Drive data set (DDS)
- P0610[1] : 2nd. Drive data set (DDS)
- P0610[2] : 3rd. Drive data set (DDS)

Dependency:

Trip level = P0604 (motor temperature warning level) * 105 %

Note:

The purpose of motor I2t is to calculate or measure the motor temperature and disable the inverter if the motor is in danger of overheating.

The motor temperature will be dependent on many factors, including the size of the motor, the ambient temperature, the previous history of the loading of the motor, and of course, the load current. (The square of the current actually determines the heating of the motor and the temperature rises with time - hence I2t).

Because most motors are cooled by built in fans running at motor speed, the speed of the motor is also important.

Clearly a motor running at high current (maybe due to boost) and a low speed, will overheat more quickly than one running at 50 or 60 Hz, full load.

The inverter takes account of these factors.

The drives also include inverter I2t protection (i.e. overheating protection, see P0290) in order to protect the units themselves.

This operates independently of the motor I2t, and is not described here.

I2t operation:

The measured motor current is displayed in r0027.

The motor temperature in °C is now displayed in r0035.

This temperature is derived either from a KTY84 temperature sensor mounted in the motor, or from a calculated value.

The value from the KTY84 is used only when P0601 = 2; in all other cases (including loss of signal from the KTY84) the calculated figure is displayed.

Therefore many other parameters are involved, including, for example, P0625, the ambient temperature. Parameter P0604 can now be adjusted to set the threshold temperature in comparison with r0035.

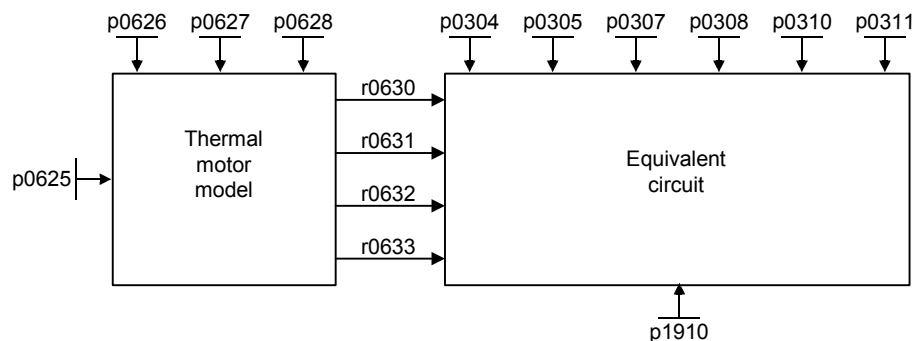
P0610 will change the reaction as before.

The reaction to the warning can be changed from this default using P0610.

Parameter r0034 is particularly useful to monitor if the calculated motor temperature is rising excessively.

P0625[3]	Ambient motor temperature				Level
	CStat: CUT	Datatype: Float	Unit: °C	Min: -40.0	3
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Def: 20.0	
			Max: 80.0		

Ambient temperature of motor at time of motor data identification.



It is only allowed to change the value when the motor is cold.
A motor identification has to be made after changing the value.

Index:

P0625[0] : 1st. Drive data set (DDS)
P0625[1] : 2nd. Drive data set (DDS)
P0625[2] : 3rd. Drive data set (DDS)

P0626[3]	Overtemperature stator iron				Level
	CStat: CUT	Datatype: Float	Unit: °C	Min: 20.0	4
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Def: 50.0	
			Max: 200.0		

Overtemperature of stator iron.

Index:

P0626[0] : 1st. Drive data set (DDS)
P0626[1] : 2nd. Drive data set (DDS)
P0626[2] : 3rd. Drive data set (DDS)

Note:

Temperature rises are valid for sinusoidal operations (line supply temperature rises).
Temperature rises due to converter operation (modulation losses) and output filter are also considered.

P0627[3]	Overtemperature stator winding				Level
	CStat: CUT	Datatype: Float	Unit: °C	Min: 20.0	4
	P-Group: MOTOR	Active: Immediately	QuickComm.: No	Def: 80.0	
			Max: 200.0		

Overtemperature of the stator winding.

It is only allowed to change the value when the motor is cold.
A motor identification has to be made after changing the value.

Index:

P0627[0] : 1st. Drive data set (DDS)
P0627[1] : 2nd. Drive data set (DDS)
P0627[2] : 3rd. Drive data set (DDS)

Note:

Temperature rises are valid for sinusoidal operations (line supply temperature rises).
Temperature rises due to converter operation (modulation losses) and output filter are also considered.

P0628[3]	Overtemperature rotor winding	Min: 20.0	Level
CStat: CUT	Datatype: Float	Def: 100.0	4
P-Group: MOTOR	Active: Immediately	QuickComm.: No	
Overtemperature of the rotor winding.			
Index:			
P0628[0] : 1st. Drive data set (DDS)			
P0628[1] : 2nd. Drive data set (DDS)			
P0628[2] : 3rd. Drive data set (DDS)			
Note:			
Temperature rises are valid for sinusoidal operations (line supply temperature rises).			
Temperature rises due to converter operation (modulation losses) and output filter are also considered.			
r0630[3]	CO: Ambient temperature	Min: -	Level
	Datatype: Float	Unit: °C	4
P-Group: MOTOR		Def: -	
Displays ambient temperature of motor mass model.			
Index:			
P0630[0] : 1st. Drive data set (DDS)			
P0630[1] : 2nd. Drive data set (DDS)			
P0630[2] : 3rd. Drive data set (DDS)			
r0631[3]	CO: Stator iron temperature	Min: -	Level
	Datatype: Float	Unit: °C	4
P-Group: MOTOR		Def: -	
Displays iron temperature of motor mass model.			
Index:			
P0631[0] : 1st. Drive data set (DDS)			
P0631[1] : 2nd. Drive data set (DDS)			
P0631[2] : 3rd. Drive data set (DDS)			
r0632[3]	CO: Stator winding temperature	Min: -	Level
	Datatype: Float	Unit: °C	4
P-Group: MOTOR		Def: -	
Displays stator winding temperature of motor mass model.			
Index:			
P0632[0] : 1st. Drive data set (DDS)			
P0632[1] : 2nd. Drive data set (DDS)			
P0632[2] : 3rd. Drive data set (DDS)			
r0633[3]	CO: Rotor winding temperature	Min: -	Level
	Datatype: Float	Unit: °C	4
P-Group: MOTOR		Def: -	
Displays rotor winding temperature of motor mass model.			
Index:			
P0633[0] : 1st. Drive data set (DDS)			
P0633[1] : 2nd. Drive data set (DDS)			
P0633[2] : 3rd. Drive data set (DDS)			

P0640[3]	Motor overload factor [%]	Min: 10.0	Level
CStat: CUT	Datatype: Float	Def: 150.0	2
P-Group: MOTOR	Active: Immediately	QuickComm.: Yes	
		Max: 400.0	

Defines motor overload current limit in [%] relative to P0305 (rated motor current).

Index:

P0640[0] : 1st. Drive data set (DDS)
P0640[1] : 2nd. Drive data set (DDS)
P0640[2] : 3rd. Drive data set (DDS)

Dependency:

Limited to maximum inverter current or to 400 % of rated motor current (P0305), whichever is the lower.

$$p0640_{\max} = \frac{\min(r0209, 4 \cdot p0305)}{p0305} \cdot 100$$

Details:

See function diagram for current limitation.

P0700[3]	Selection of command source	Min: 0	Level
CStat: CT	Datatype: U16	Unit: -	1
P-Group: COMMANDS	Active: first confirm	QuickComm.: Yes	
		Def: 6 Max: 6	

Selects digital command source.

Possible Settings:

0 Factory default setting
2 Terminal
4 USS on RS232
6 Fieldbus

Index:

P0700[0] : 1st. Command data set (CDS)
P0700[1] : 2nd. Command data set (CDS)
P0700[2] : 3rd. Command data set (CDS)

Dependency:

Parameter P0719 has higher priority than P0700.
Changing this parameter from P0700 = x to P0700 = 2 resets functional settings (P0701, ...) of digital inputs to default.

**Caution:**

Be aware, by changing of parameter P0700 the respective BI parameters are reset to the default value automatically.
Terminal is only for test purposes - not for use in normal operation!

P0701[3]	Function of digital input 0				Min: 0	Level 4
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 99		

Selects function of digital input 0.

Possible Settings:

- 0 Digital input disabled
- 1 ON/OFF1
- 2 ON reverse /OFF1
- 3 OFF2 - coast to standstill
- 4 OFF3 - quick ramp-down
- 9 Fault acknowledge
- 10 JOG right
- 11 JOG left
- 12 Reverse
- 29 External trip
- 33 Disable additional freq setpoint
- 99 Enable BICO parameterization

Index:

- P0701[0] : 1st. Command data set (CDS)
- P0701[1] : 2nd. Command data set (CDS)
- P0701[2] : 3rd. Command data set (CDS)

Dependency:

- Setting 99 (enable BICO parameterization) requires
- P0700 command source or
 - P0010 = 1, P3900 = 1, 2 or 3 quick commissioning or
 - P0010 = 30, P0970 = 1 factory reset in order to reset.

Note:

"ON/OFF1" can only be selected for one digital input (e.g. P0700 = 2 and P0701 = 1).
 Configuring DIN1 with P0702 = 1 will disable DIN0 by setting P0701 = 0.
 "ON/OFF1" on a digital input can be combined with "ON reverse/OFF1" on another digital input.
 Only the first activated digital input serves as a command source.

Details:

JOG ==> see p1058

P0702[3]	Function of digital input 1				Min: 0	Level 4
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 99		

Selects function of digital input 1.

Possible Settings:

- 0 Digital input disabled
- 1 ON/OFF1
- 2 ON reverse /OFF1
- 3 OFF2 - coast to standstill
- 4 OFF3 - quick ramp-down
- 9 Fault acknowledge
- 10 JOG right
- 11 JOG left
- 12 Reverse
- 29 External trip
- 33 Disable additional freq setpoint
- 99 Enable BICO parameterization

Index:

- P0702[0] : 1st. Command data set (CDS)
- P0702[1] : 2nd. Command data set (CDS)
- P0702[2] : 3rd. Command data set (CDS)

Details:

See P0701 (function of digital input0).

P0719[3]	Selection of cmd. & freq. setp.			Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 66	

Central switch to select control command source for inverter.
Switches command and setpoint source between freely programmable BICO parameters and fixed command/setpoint profiles.
Command and setpoint sources can be changed independently.

The tens digit chooses the command source and the units digit chooses the setpoint source.

Possible Settings:

0	Cmd=BICO param.	Setp=BICO param.
4	Cmd=BICO param.	Setp=USS on RS232
6	Cmd=BICO param.	Setp=Fieldbus
40	Cmd=USS on RS232	Setp=BICO param.
44	Cmd=USS on RS232	Setp=USS on RS232
46	Cmd=USS on RS232	Setp=Fieldbus
60	Cmd=Fieldbus	Setp=BICO param.
64	Cmd=Fieldbus	Setp=USS on RS232
66	Cmd=Fieldbus	Setp=Fieldbus

Index:

P0719[0]	: 1st. Command data set (CDS)
P0719[1]	: 2nd. Command data set (CDS)
P0719[2]	: 3rd. Command data set (CDS)

Notice:

Particularly useful when e.g. changing command source temporarily from P0700 = 6.
Settings in p0719 (contrary to p0700 settings) do not reset the values for the BICO parameters.

Dependency:

P0719 has higher priority than P0700 and P1000.
If set to a value other than 0 (i.e. BICO parameter is not the setpoint source), P0844 / P0848 (first source of OFF2 / OFF3) are not effective; instead, P0845 / P0849 (second source of OFF2 / OFF3) apply and the OFF commands are obtained via the particular source defined.
BICO connections made previously remain unchanged.

r0720	Number of digital inputs			Min: -	Level 4
	Datatype: U16	Unit: -	Def: -	Max: -	
	P-Group: COMMANDS				

Displays number of digital inputs.

r0722	CO/BO: Binary input values			Min: -	Level 4
	Datatype: U16	Unit: -	Def: -	Max: -	
	P-Group: COMMANDS				

Displays status of digital inputs.

Bitfields:

Bit00	Digital input 0	0	Off	1	On
Bit01	Digital input 1	0	Off	1	On

Note:

Segment is lit when signal is active.

P0724	Debounce time for digital inputs			Min: 0	Level 4
	CStat: CT	Datatype: U16	Unit: -	Def: 3	
	P-Group: COMMANDS	Active: Immediately	QuickComm.: No	Max: 3	

Defines debounce time (filtering time) used for digital inputs.

Possible Settings:

0	No debounce time
1	2.5 ms debounce time
2	8.2 ms debounce time
3	12.3 ms debounce time

r0730	Number of digital outputs			Min: -	Level 4
	Datatype: U16	Unit: -	Def: -	Max: -	
	P-Group: COMMANDS				

Displays number of digital outputs (relays).

P0731[3]	BI: Function of digital output 0				Min: 0:0	Level 4
	CStat: CUT	Datatype: U32	Unit: -	Def: 52:3		
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 40000:0		

Defines source of digital output 0.

Index:

P0731[0] : 1st. Command data set (CDS)
P0731[1] : 2nd. Command data set (CDS)
P0731[2] : 3rd. Command data set (CDS)

Notice:

An inverse logic can be realised by inverting the digital outputs in P0748.

Common Settings:

52.0	Drive ready	0	Closed
52.1	Drive ready to run	0	Closed
52.2	Drive running	0	Closed
52.3	Drive fault active	0	Closed
52.4	OFF2 active	1	Closed
52.5	OFF3 active	1	Closed
52.6	Switch on inhibit active	0	Closed
52.7	Drive warning active	0	Closed
52.8	Deviation setpoint/actual value	1	Closed
52.9	P2D control (Process Data Control)	0	Closed
52.A	Act. freq. f_act >= P1082 (f_max)	0	Closed
52.B	Warning: Motor current limit	1	Closed
52.C	Motor holding brake (MHB) active	0	Closed
52.D	Motor overload	1	Closed
52.E	Motor running direction right	0	Closed
52.F	Inverter overload	1	Closed
53.1	Act. freq. f_act > P2167 (f_off)	0	Closed
53.2	Act. freq. f_act > P1080 (f_min)	0	Closed
53.3	Act. current r0027 >= P2170	0	Closed
53.4	Act. freq. f_act > P2155 (f_1)	0	Closed
53.5	Act. freq. f_act <= P2155 (f_1)	0	Closed
53.6	Act. freq. f_act >= setpoint	0	Closed
53.8	Act. Vdc r0026 > P2172	0	Closed

Details:

Monitor functions ==> see parameter r0052, r0053
Motor holding brake ==> see parameter P1215

P0732[3]	BI: Function of digital output 1	Min: 0:0	Level
CStat: CUT	Datatype: U32	Def: 52:7	4
P-Group: COMMANDS	Active: first confirm	QuickComm.: No	

Defines source of digital output 1.

Index:

P0732[0] : 1st. Command data set (CDS)
P0732[1] : 2nd. Command data set (CDS)
P0732[2] : 3rd. Command data set (CDS)

Common Settings:

52.0	Drive ready	0	Closed
52.1	Drive ready to run	0	Closed
52.2	Drive running	0	Closed
52.3	Drive fault active	0	Closed
52.4	OFF2 active	1	Closed
52.5	OFF3 active	1	Closed
52.6	Switch on inhibit active	0	Closed
52.7	Drive warning active	0	Closed
52.8	Deviation setpoint/actual value	1	Closed
52.9	PZD control (Process Data Control)	0	Closed
52.A	Act. freq. f_act >= P1082 (f_max)	0	Closed
52.B	Warning: Motor current limit	1	Closed
52.C	Motor holding brake (MHB) active	0	Closed
52.D	Motor overload	1	Closed
52.E	Motor running direction right	0	Closed
52.F	Inverter overload	1	Closed
53.1	Act. freq. f_act > P2167 (f_off)	0	Closed
53.2	Act. freq. f_act > P1080 (f_min)	0	Closed
53.3	Act. current r0027 >= P2170	0	Closed
53.4	Act. freq. f_act > P2155 (f_1)	0	Closed
53.5	Act. freq. f_act <= P2155 (f_1)	0	Closed
53.6	Act. freq. f_act >= setpoint	0	Closed
53.7	Act. Vdc r0026 < P2172	0	Closed
53.8	Act. Vdc r0026 > P2172	0	Closed

r0747	CO/BO: State of digital outputs	Min: -	Level
	Datatype: U16	Def: -	4
	P-Group: COMMANDS	Max: -	

Displays status of digital outputs (also includes inversion of digital outputs via P0748).

Bitfields:

Bit00	Digital output 0 energized	0	No	1	Yes
Bit01	Digital output 1 energized	0	No	1	Yes

Dependency:

Bit 0 = 0 :
Contacts open

Bit 0 = 1 :
Contacts closed

P0748	Invert digital outputs	Min: 0	Level
CStat: CUT	Datatype: U16	Def: 0	4
P-Group: COMMANDS	Active: first confirm	QuickComm.: No	

Defines high and low states of relay for a given function.

Bitfields:

Bit00	Invert digital output 0	0	No	1	Yes
Bit01	Invert digital output 1	0	No	1	Yes

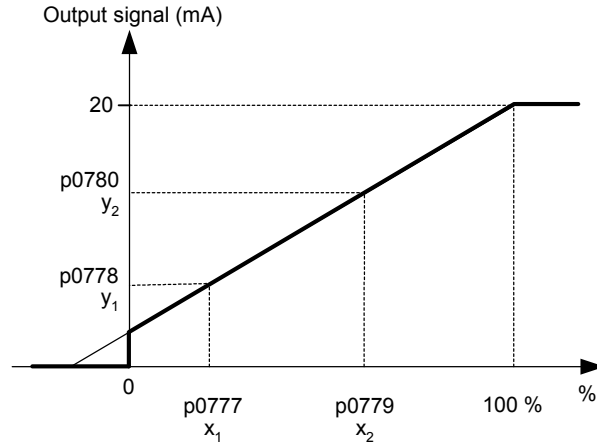
r0770	Number of DACs	Min: -	Level
	Datatype: U16	Def: -	4
	P-Group: TERMINAL	Max: -	

Displays number of analog outputs available.

P0771[2]	CI: DAC	Datatype: U32	Unit: -	Min: 0:0	Level 4
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 21:0	
	P-Group: TERMINAL			Max: 40000:0	
	Defines function of the 0 - 20 mA analog output.				
Index:	P0771[0] : Analog output 0 (DAC 0) P0771[1] : Analog output 1 (DAC 1)				
Common Settings:	21 CO: Act. frequency (scaled to P2000) 24 CO: Act. output frequency (scaled to P2000) 25 CO: Act. output voltage (scaled to P2001) 26 CO: Act. DC-link voltage (scaled to P2001) 27 CO: Act. output current (scaled to P2002)				
P0773[2]	Smooth time DAC	Datatype: U16	Unit: ms	Min: 0	Level 4
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 2	
	P-Group: TERMINAL			Max: 1000	
	Defines smoothing time [ms] for analog output signal. This parameter enables smoothing for DAC using a PT1 filter.				
Index:	P0773[0] : Analog output 0 (DAC 0) P0773[1] : Analog output 1 (DAC 1)				
Dependency:	P0773 = 0: Deactivates filter.				
r0774[2]	Act. DAC value [V] or [mA]	Datatype: Float	Unit: -	Min: -	Level 4
	P-Group: TERMINAL			Def: -	
				Max: -	
	Shows value of analog output in [mA] after filtering and scaling.				
Index:	P0774[0] : Analog output 0 (DAC 0) P0774[1] : Analog output 1 (DAC 1)				
P0776[2]	Type of DAC	Datatype: U16	Unit: -	Min: 0	Level 4
	CStat: CT	Active: first confirm	QuickComm.: No	Def: 0	
	P-Group: TERMINAL			Max: 0	
	Defines type of analog output.				
Possible Settings:	0 Voltage output				
Index:	P0776[0] : Analog output 0 (DAC 0) P0776[1] : Analog output 1 (DAC 1)				
Note:	The analog output is designed as a voltage output with a range of 0 - 3.3 V.				

P0777[2]	Value x1 of DAC scaling	Min: -99999.0	Level 4	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: TERMINAL	Active: first confirm		QuickComm.: No
		Def: 0.0		
		Max: 99999.0		

Defines x1 output characteristic in [%].
 Scaling block is responsible for adjustment of output value defined in P0771 (DAC connector input).
 Parameters of DAC scaling block (P0777 ... P0781) work as follows:



Where:
 Points P1 (x1, y1) and P2 (x2, y2) can be chosen freely.

Index:

P0777[0] : Analog output 0 (DAC 0)
 P0777[1] : Analog output 1 (DAC 1)

Example:

The default values of the scaling block provides a scaling of:
 P1: 0.0 % = 0 mA
 P2: 100.0 % = 20 mA

Dependency:

Affects P2000 to P2003 (referency frequency, voltage, current or torque) depending on which setpoint is to be generated.

Note:

The DAC-linear characteristic is described by 4 coordinates, based on a two-point equation:

$$\frac{y - p0778}{x - p0777} = \frac{p0780 - p0778}{p0779 - p0777}$$

For calculations the point-gradient form (offset and gradient) is more advantageous:

$$y = m \cdot x + y_0$$

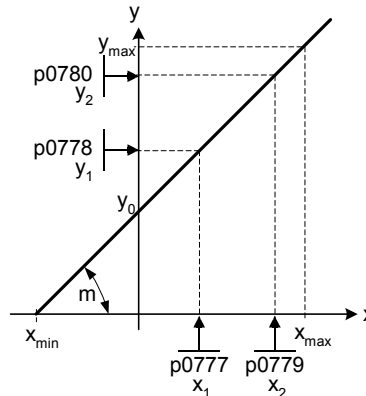
The transformation between these two forms is given by:

$$m = \frac{p0780 - p0778}{p0779 - p0777} \quad y_0 = \frac{p0778 \cdot p0779 - p0777 \cdot p0780}{p0779 - p0777} \leq |200\%|$$

For scaling of the input the value of y_max and x_min has to be determined. This is done by the following equations:

$$x_{min} = \frac{p0780 \cdot p0777 - p0778 \cdot p0779}{p0780 - p0778}$$

$$y_{max} = (x_{max} - x_{min}) \cdot \frac{p0780 - p0778}{p0779 - p0777}$$



P0778[2]	Value y1 of DAC scaling	Min: 0	Level 4	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: TERMINAL	Active: first confirm		QuickComm.: No

Defines y1 of output characteristic.

Index:

- P0778[0] : Analog output 0 (DAC 0)
- P0778[1] : Analog output 1 (DAC 1)

P0779[2]	Value x2 of DAC scaling	Min: -99999.0	Level 4	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: TERMINAL	Active: first confirm		QuickComm.: No

Defines x2 of output characteristic in [%].

Index:

- P0779[0] : Analog output 0 (DAC 0)
- P0779[1] : Analog output 1 (DAC 1)

Dependency:

Affects P2000 to P2003 (referency frequency, voltage, current or torque) depending on which setpoint is to be generated.

P0780[2]	Value y2 of DAC scaling	Min: 0	Level 4	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: TERMINAL	Active: first confirm		QuickComm.: No

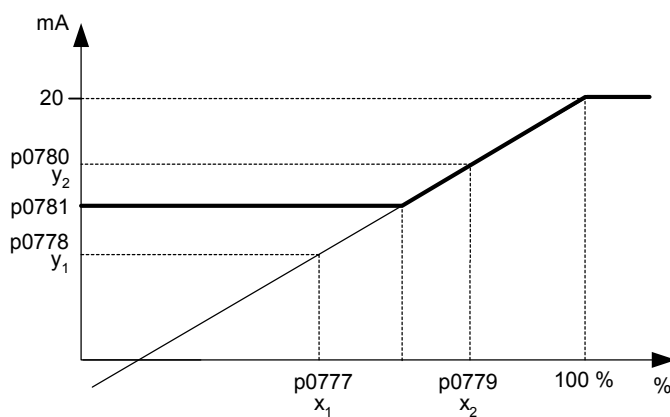
Defines y2 of output characteristic.

Index:

- P0780[0] : Analog output 0 (DAC 0)
- P0780[1] : Analog output 1 (DAC 1)

P0781[2]	Width of DAC deadband	Min: 0	Level 4	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: TERMINAL	Active: first confirm		QuickComm.: No

Sets width of dead-band in [mA] for analog output.



Index:

- P0781[0] : Analog output 0 (DAC 0)
- P0781[1] : Analog output 1 (DAC 1)

P0802	Transfer data from EEPROM	Min: 0	Level 3
	CStat: CT Datatype: U16 Unit: - P-Group: PAR_RESET Active: first confirm QuickComm.: No Def: 0 Max: 2		
Transfers values from drive to a MMC-PS (upload). Creates a clone file. Transfer is as follows: RAM -> EEPROM -> MMC-PS. The name of the clone file can be modified by p0804 ("clone00.bin" to "clone99.bin")			
Possible Settings:			
0 Disabled			
2 Start MMC Transfer			
Index:			
P0802[0] : 1st. Drive data set (DDS)			
P0802[1] : 2nd. Drive data set (DDS)			
P0802[2] : 3rd. Drive data set (DDS)			
Note:			
An upload is only possible, if p0010 = 30. Parameters P0010 und P0802 are set to 0 automatically on successful completion of the upload. Ensure that enough space exists on the MMC-PS before transferring data (8kb). Details see Operating Instructions.			
P0803	Transfer data to EEPROM	Min: 0	Level 3
	CStat: CT Datatype: U16 Unit: - P-Group: PAR_RESET Active: first confirm QuickComm.: No Def: 0 Max: 2		
Transfers values from an MMC-PS to drive (download).			
Possible Settings:			
0 Disabled			
2 Start MMC Transfer			
Index:			
P0803[0] : 1st. Drive data set (DDS)			
P0803[1] : 2nd. Drive data set (DDS)			
P0803[2] : 3rd. Drive data set (DDS)			
Note:			
An download is only possible, if p0010 = 30. Parameters P0010 und P0802 are set to 0 automatically on successful completion of the download. Details see Operating Instructions.			
P0804	Select Clone file	Min: 0	Level 3
	CStat: CT Datatype: U16 Unit: - P-Group: PAR_RESET Active: first confirm QuickComm.: No Def: 0 Max: 99		
Select clone file to up/down load. - if P804=0 then file name is clone00.bin - if P804=1 then file name is clone01.bin - etc.			
Index:			
P0804[0] : 1st. Drive data set (DDS)			
P0804[1] : 2nd. Drive data set (DDS)			
P0804[2] : 3rd. Drive data set (DDS)			

P0809[3]	Copy command data set (CDS)				Min: 0	Level 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 2		

Calls 'Copy Command Data Set (CDS)' function.

The list of all Command Data Sets (CDS) are shown in the opening instructions of the Parameter List (PLI).

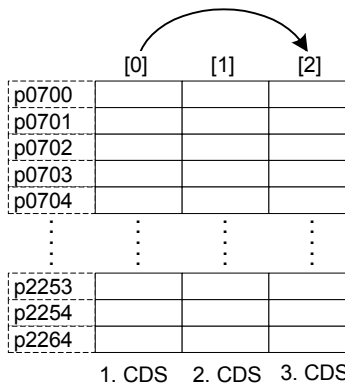
Index:

- P0809[0] : Copy from CDS
- P0809[1] : Copy to CDS
- P0809[2] : Start copy

Example:

Copying of all values from CDS1 to CDS3 can be accomplished by the following procedure:

- p0809[0] = 0 1. CDS
- p0809[1] = 2 3. CDS
- p0809[2] = 1 Start copy

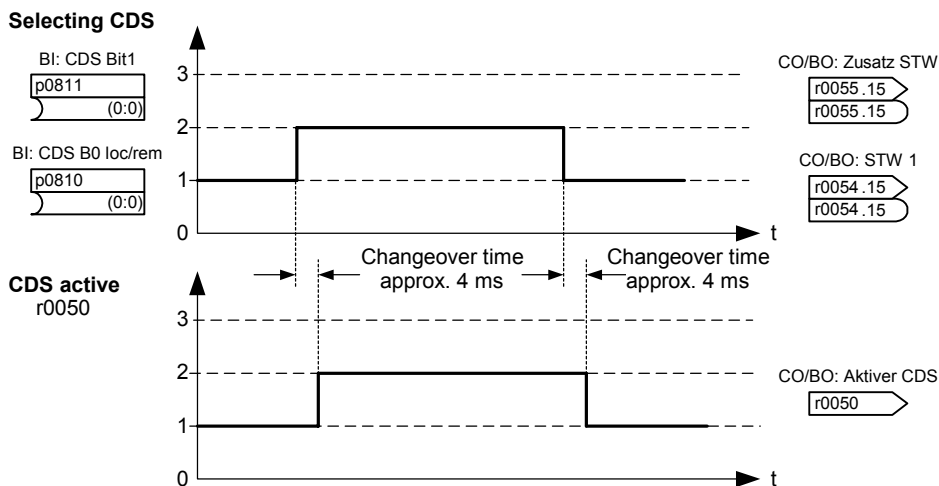


Note:

Start value in index 2 is automatically reset to '0' after execution of function.

P0810	BI: CDS bit 0 (Hand/Auto)	Min: 0:0	Level 2	
	CStat: CUT	Datatype: U32		Def: 0:0
	P-Group: COMMANDS	Active: first confirm		QuickComm.: No

Selects command source from which to read Bit 0 for selecting a command data set (CDS).



The actual active command data set (CDS) is displayed in parameter r0050.

	selected CDS		active CDS
	r0055 Bit15	r0054 Bit15	r0050
1. CDS	0	0	0
2. CDS	0	1	1
3. CDS	1	0	2
3. CDS	1	1	2

Note: P0811 is also relevant for command data set (CDS) set selection.

P0811	BI: CDS bit 1	Min: 0:0	Level 2	
	CStat: CUT	Datatype: U32		Def: 0:0
	P-Group: COMMANDS	Active: first confirm		QuickComm.: No

Selects command source from which to read Bit 1 for selecting a command data set (see P0810).

Note: P0810 is also relevant for command data set (CDS) selection.

P0819[3]	Copy drive data set (DDS)				Min: 0	Level 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 2		

Calls 'Copy Drive Data Set (DDS)' function.

The list of all Drive Data Sets (DDS) are shown in the opening instructions of the Parameter List (PLI).

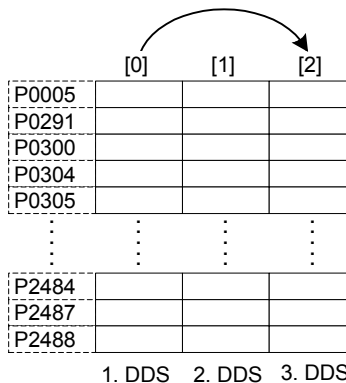
Index:

- P0819[0] : Copy from DDS
- P0819[1] : Copy to DDS
- P0819[2] : Start copy

Example:

Copying of all values from DDS1 to DDS3 can be accomplished by the following procedure:

- P0819[0] = 0 1. DDS
- P0819[1] = 2 3. DDS
- P0819[2] = 1 Start copy

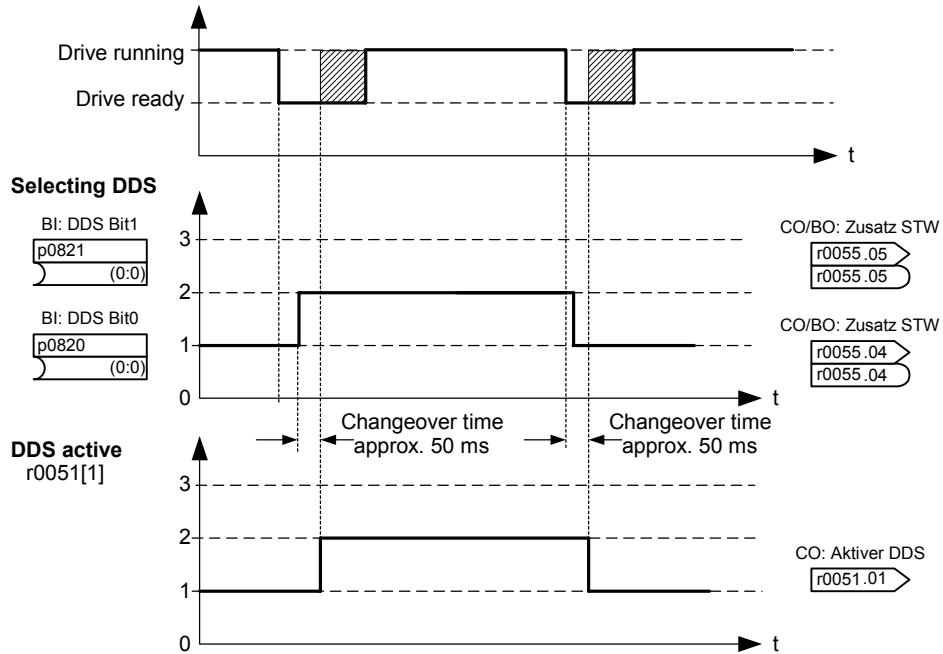


Note:

Start value in index 2 is automatically reset to '0' after execution of function.

P0820	BI: DDS bit 0	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: COMMANDS			Max: 40000:0	

Selects command source from which to read Bit 0 for selecting a drive data set (DDS).



The actual active drive data set (DDS) is displayed in parameter r0051[1].

	selected DDS			active DDS
	r0055 Bit05	r0055 Bit04	r0051 [0]	r0051 [1]
1. DDS	0	0	0	0
2. DDS	0	1	1	1
3. DDS	1	0	2	2
3. DDS	1	1	2	2

Note: P0821 is also relevant for drive data set (DDS) selection.

P0821	BI: DDS bit 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: COMMANDS			Max: 40000:0	

Selects command source from which Bit 1 for selecting a drive data set is to be read in (see parameter P0820).

Note: P0820 is also relevant for drive data set (DDS) selection.

P0840[3]	BI: ON/OFF1			Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 2090:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 40000:0	

Allows ON/OFF1 command source to be selected using BICO.

The first digits describe the parameter number of the command source; the last digit denotes the bit setting for that parameter.

Index:

P0840[0] : 1st. Command data set (CDS)
P0840[1] : 2nd. Command data set (CDS)
P0840[2] : 3rd. Command data set (CDS)

P0842[3]	BI: ON reverse/OFF1			Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 0:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 40000:0	

Allows ON/OFF1 reverse command source to be selected using BICO.

Dabei wird i.a. bei einem positiven Frequenzsollwert dieser entgegen dem Uhrzeigersinn (negative Frequenz) angefahren.

The first digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0842[0] : 1st. Command data set (CDS)
P0842[1] : 2nd. Command data set (CDS)
P0842[2] : 3rd. Command data set (CDS)

P0844[3]	BI: 1. OFF2			Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 40000:0	

Defines first source of OFF2 when P0719 = 0 (BICO).

The first digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0844[0] : 1st. Command data set (CDS)
P0844[1] : 2nd. Command data set (CDS)
P0844[2] : 3rd. Command data set (CDS)

Dependency:

The inverter will not run unless the source for OFF2 is active.

Note:

OFF2 means immediate pulse-disabling; the motor is coasting.

OFF2 is low-active, i.e. :
0 = Pulse disabling.
1 = Operating condition.

P0845[3]	BI: 2. OFF2			Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 40000:0	

Defines second source of OFF2.

The first digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0845[0] : 1st. Command data set (CDS)
P0845[1] : 2nd. Command data set (CDS)
P0845[2] : 3rd. Command data set (CDS)

Dependency:

In contrast to P0844 (first source of OFF2), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).

The inverter will not run unless the second source for OFF2 is active.

Note:

OFF2 means immediate pulse-disabling; the motor is coasting.

OFF2 is low-active, i.e. :
0 = Pulse disabling.
1 = Operating condition.

P0848[3]	BI: 1. OFF3			Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 40000:0	

Defines first source of OFF3 when P0719 = 0 (BICO).

The first digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0848[0] : 1st. Command data set (CDS)
P0848[1] : 2nd. Command data set (CDS)
P0848[2] : 3rd. Command data set (CDS)

Dependency:

The inverter will not run unless the source for OFF3 is active.

Note:

OFF3 means quick ramp-down to 0.

OFF3 is low-active, i.e.

0 = Quick ramp-down.

1 = Operating condition.

P0849[3]	BI: 2. OFF3			Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 40000:0	

Defines second source of OFF3.

The first digits describe the parameter number of the command source and the last digit denotes the bit setting for that parameter.

Index:

P0849[0] : 1st. Command data set (CDS)
P0849[1] : 2nd. Command data set (CDS)
P0849[2] : 3rd. Command data set (CDS)

Dependency:

In contrast to P0848 (first source of OFF3), this parameter is always active, independent of P0719 (selection of command and frequency setpoint).

The inverter will not run unless the second source for OFF3 is active.

Note:

OFF3 means quick ramp-down to 0.

OFF3 is low-active, i.e.

0 = Quick ramp-down.

1 = Operating condition.

P0852[3]	BI: Pulse enable			Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 1:0	
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No	Max: 40000:0	

Defines source of pulse enable/disable signal.

Index:

P0852[0] : 1st. Command data set (CDS)
P0852[1] : 2nd. Command data set (CDS)
P0852[2] : 3rd. Command data set (CDS)

P0927	Parameter changeable via				Min: 0	Level 2
	CStat: CUT	Datatype: U16	Unit: -	Def: 15		
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max: 15		

Specifies the interfaces which can be used to change parameters.

This parameter allows the user to easily protect the inverter from unauthorized modification of parameters.
Annotation: Parameter P0927 is not password protected.

Bitfields:

Bit00	Fieldbus	0	No	1	Yes
Bit01	Not used	0	No	1	Yes
Bit02	USS on RS232	0	No	1	Yes
Bit03	Not used	0	No	1	Yes

Example:

Bits 0, 1, 2 and 3 set:
The default setting allows parameters to be changed via any interface.
Bits 0, 1, 2 und 3 = 0:
This setting allows no parameters to be modified via any interface with the exception of P0003 and P0927.

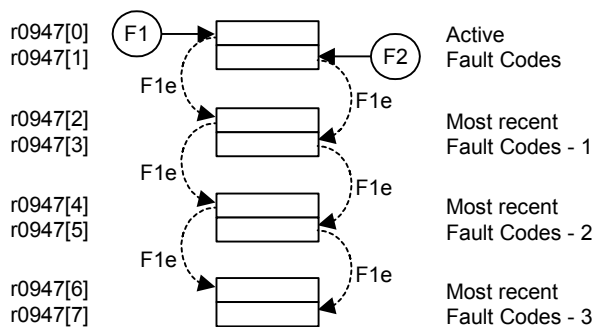
r0947[8]	Last fault code			Min: -	Level 2
		Datatype: U16	Unit: -	Def: -	
	P-Group: ALARM			Max: -	

Displays fault history according to the diagram below

where:

- "F1" is the first active fault (not yet acknowledged).
- "F2" is the second active fault (not yet acknowledged).
- "F1e" is the occurrence of the fault acknowledgement for F1 & F2.

This moves the value in the 2 indices down to the next pair of indices, where they are stored.
Indices 0 & 1 contain the active faults.
When faults are acknowledged, indices 0 & 1 are reset to 0.



Index:

- P0947[0] : Recent fault trip --, fault 1
- P0947[1] : Recent fault trip --, fault 2
- P0947[2] : Recent fault trip -1, fault 3
- P0947[3] : Recent fault trip -1, fault 4
- P0947[4] : Recent fault trip -2, fault 5
- P0947[5] : Recent fault trip -2, fault 6
- P0947[6] : Recent fault trip -3, fault 7
- P0947[7] : Recent fault trip -3, fault 8

Example:

If the inverter trips on undervoltage and then receives an external trip before the undervoltage is acknowledged, you will obtain:

- r0947[0] = 3 Undervoltage (F0003)
- r0947[1] = 85 External trip (F0085)

Whenever a fault in index 0 is acknowledged (F1e), the fault history shifts as indicated in the diagram above.

Notice:

It is possible that this parameter is empty but a fault is still indicated by the Drive. The reason for this is most likely due to a SAFE CONDITION still existing in the system. In this situation the alarm is cleared from this parameter and it makes no sense to go back to a READY STATE. First remove the reason for the SAFE CONDITION and then the Drive will be able to change to a READY STATE. (SAFE CONDITION example is SG1 and SG6 inactive)

Dependency:

Index 1 used only if second fault occurs before first fault is acknowledged.

Details:

See "Faults and Warnings"

r0948[12]	Fault time	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: ALARM			Def: -	
				Max: -	

Time stamp to indicate when the fault has occurred.

P2114 (run-time counter) or P2115 (real time clock) are the possible sources of the time stamp.

Index:

P0948[0] : Recent trip --, sec. + minutes
 P0948[1] : Recent trip --, hours + days
 P0948[2] : Recent trip --, month + year
 P0948[3] : Recent trip -1, sec. + minutes
 P0948[4] : Recent trip -1, hours + days
 P0948[5] : Recent trip -1, month + year
 P0948[6] : Recent trip -2, sec. + minutes
 P0948[7] : Recent trip -2, hours + days
 P0948[8] : Recent trip -2, month + year
 P0948[9] : Recent trip -3, sec. + minutes
 P0948[10] : Recent trip -3, hours + days
 P0948[11] : Recent trip -3, month + year

Example:

The time is taken from P2115 if this parameter has been updated with the real time. If not, P2114 is used.

r0949[8]	Fault value	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: ALARM			Def: -	
				Max: -	

Displays drive fault values. It is for service purposes and indicate the type of fault reported.

Index:

P0949[0] : Recent trip --, fault value 1
 P0949[1] : Recent trip --, fault value 2
 P0949[2] : Recent trip -1, fault value 3
 P0949[3] : Recent trip -1, fault value 4
 P0949[4] : Recent trip -2, fault value 5
 P0949[5] : Recent trip -2, fault value 6
 P0949[6] : Recent trip -3, fault value 7
 P0949[7] : Recent trip -3, fault value 8

P0952	Total number of faults			Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: ALARM	Active: first confirm	QuickComm.: No	Max: 8	

Displays number of faults stored in P0947 (last fault code).

Dependency:

Setting 0 resets fault history.
 (changing to 0 also resets parameter r0948 - fault time).

r0964[7]	Firmware version data	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
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P-Group: COMM

Firmware version data.

Index:

P0964[0] : Company (Siemens = 42)
P0964[1] : Product type
P0964[2] : Firmware version
P0964[3] : Firmware date (year)
P0964[4] : Firmware date (day/month)
P0964[5] : Number of drive objects
P0964[6] : Firmware version

Example:

No.	Value	Meaning
r0964[0]	42	SIEMENS
r0964[1]	1001	MICROMASTER 420
	1002	MICROMASTER 440
	1003	MICRO- / COMBIMASTER 411
	1004	MICROMASTER 410
	1005	reserved
	1006	MICROMASTER 440 PX
	1007	MICROMASTER 430
	5301	SINAMICS G110
r0964[1]	5310	ET 200S FC
	r0964[2]	105
r0964[3]	2001	27.10.2001
r0964[4]	2710	
r0964[5]	1	Drive objects
r0964[6]	200	Firmware Vaa.bb.02.00

r0967	Control word 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
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P-Group: COMM

Displays control word 1.

Bitfields:

Bit00	ON/OFF1	0	No	1	Yes
Bit01	OFF2: Electrical stop	0	Yes	1	No
Bit02	OFF3: Fast stop	0	Yes	1	No
Bit03	Pulse enable	0	No	1	Yes
Bit04	RFG enable	0	No	1	Yes
Bit05	RFG start	0	No	1	Yes
Bit06	Setpoint enable	0	No	1	Yes
Bit07	Fault acknowledge	0	No	1	Yes
Bit08	JOG right	0	No	1	Yes
Bit09	JOG left	0	No	1	Yes
Bit10	Control from PLC	0	No	1	Yes
Bit11	Reverse (setpoint inversion)	0	No	1	Yes
Bit15	CDS Bit 0 (Hand/Auto)	0	No	1	Yes

r0968	Status word 1	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: COMM			Def: - Max: -	

Displays active status word of inverter (in binary) and can be used to diagnose which commands are active.

Bitfields:

Bit00	Drive ready	0	No	1	Yes
Bit01	Drive ready to run	0	No	1	Yes
Bit02	Drive running	0	No	1	Yes
Bit03	Drive fault active	0	No	1	Yes
Bit04	OFF2 active	0	Yes	1	No
Bit05	OFF3 active	0	Yes	1	No
Bit06	ON inhibit active	0	No	1	Yes
Bit07	Drive warning active	0	No	1	Yes
Bit08	Deviation setp. / act. value	0	Yes	1	No
Bit09	PZD control	0	No	1	Yes
Bit10	f_act >= P1082 (f_max)	0	No	1	Yes
Bit11	Warning: Motor current limit	0	Yes	1	No
Bit12	Motor holding brake active	0	No	1	Yes
Bit13	Motor overload	0	Yes	1	No
Bit14	Motor runs right	0	No	1	Yes
Bit15	Inverter overload	0	Yes	1	No

P0970	Factory reset			Min: 0	Level 1
	CStat: C	Datatype: U16	Unit: -	Def: 0	
	P-Group: PAR_RESET	Active: first confirm	QuickComm.: No	Max: 10	

P0970 = 1 resets all parameters to their default values.

Possible Settings:

0	Disabled
1	Parameter reset (without safety)
10	Parameter reset (safety only)

Dependency:

First set P0010 = 30 (factory settings).

Stop drive (i.e. disable all pulses) before you can reset parameters to default values.

Note:

Certain parameters will not be changed when performing a factory reset.

The following parameters retain their values after a factory reset:

- P0014 Store mode
- P0100 Europe / North America
- P2010 USS baud rate
- P2011 USS address
- r0039 CO: Energy consumption meter [kWh]

On the ICU24F setting 10 is available to reset the safety parameters to their default values. Only the safety parameters will be reset.

Select P0010 = 30 before and set the safety password.

When transferring parameter p0970, ET 200S FC uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations.

This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):

- Parameter fault 30
- Drive fault 70
- Drive fault 75

When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.

The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

P0971	Transfer data from RAM to EEPROM				Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max: 1		

Transfers values from RAM to EEPROM when P0971 set to 1.

Possible Settings:

- 0 Disabled
- 1 Start transfer

Note:

Changed values in RAM are transferred to EEPROM.

Parameter is automatically reset to 0 (default) after successful transfer.

During the reset process communications will be interrupted.

After completion of the transfer process, the communication between the inverter and the PC-tools (e.g. Starter) is automatically re-established.

P1000[3]	Selection of frequency setpoint				Min: 0	Level 1
	CStat: CT	Datatype: U16	Unit: -	Def: 6		
	P-Group: SETPOINT	Active: first confirm	QuickComm.: Yes	Max: 66		

Selects frequency setpoint source.

In the table of possible settings below, the main setpoint is selected from the least significant digit (i.e., 0 to 6) and any additional setpoint from the most significant digit (i.e., x0 through to x6).

Possible Settings:

- 0 No main setpoint
- 4 USS on RS232
- 6 Fieldbus
- 40 No main setp. + USS on RS232
- 44 USS on RS232 + USS on RS232
- 46 Fieldbus + USS on RS232
- 60 No main setp. + Fieldbus
- 64 USS on RS232 + Fieldbus
- 66 Fieldbus + Fieldbus

Index:

- P1000[0] : 1st. Command data set (CDS)
- P1000[1] : 2nd. Command data set (CDS)
- P1000[2] : 3rd. Command data set (CDS)

Dependency:

Parameter P0719 has higher priority than P1000.

Note:

Single digits denote main setpoints that have no additional setpoint.

Caution:

Changing this parameter sets (to default) all settings on item selected (see table).



		p1000 = xy			
		y = 0	y = 4	y = 6	
x = 0	p1000 = xy	0.0	2015.1	2050.1	p1070
		1.0	1.0	1.0	p1071
		0.0	0.0	0.0	p1075
		1.0	1.0	1.0	p1076
x = 4	p1000 = xy	0.0	2015.1	2050.1	p1070
		1.0	1.0	1.0	p1071
		2015.1	2015.1	2015.1	p1075
		1.0	1.0	1.0	p1076
x = 6	p1000 = xy	0.0	2015.1	2050.1	p1070
		1.0	1.0	1.0	p1071
		2050.1	2050.1	2050.1	p1075
		1.0	1.0	1.0	p1076

Example: p1000 = 46 → p1070 = 2050.1
 p1071 = 1.0
 p1075 = 2015.1
 p1076 = 1.0

P1055[3]	BI: Enable JOG right	Min: 0:0	Level 3	
	CStat: CT	Datatype: U32		Def: 2090:8
	P-Group: COMMANDS	Active: first confirm		QuickComm.: No

Defines source of JOG right.

Index:

P1055[0] : 1st. Command data set (CDS)
P1055[1] : 2nd. Command data set (CDS)
P1055[2] : 3rd. Command data set (CDS)

P1056[3]	BI: Enable JOG left	Min: 0:0	Level 3	
	CStat: CT	Datatype: U32		Def: 2090:9
	P-Group: COMMANDS	Active: first confirm		QuickComm.: No

Defines source of JOG left.

Index:

P1056[0] : 1st. Command data set (CDS)
P1056[1] : 2nd. Command data set (CDS)
P1056[2] : 3rd. Command data set (CDS)

P1058[3]	JOG frequency	Min: 0.00	Level 2	
	CStat: CUT	Datatype: Float		Def: 5.00
	P-Group: SETPOINT	Active: Immediately		QuickComm.: No

Jogging increases the motor speed by small amounts.

The JOG function is activated via the control word.

While the JOG function is active, parameter P1058 determines the frequency at which the inverter will run.

The JOG mode allows the operator to perform a specific number of revolutions and position the rotor manually.

The motor speed is increased as long as 'JOG left' or 'JOG right' are selected and until the left or right JOG frequency is reached.

Index:

P1058[0] : 1st. Drive data set (DDS)
P1058[1] : 2nd. Drive data set (DDS)
P1058[2] : 3rd. Drive data set (DDS)

Dependency:

P1060 and P1061 set up and down ramp times respectively for jogging.

Rounding times (P1130 - P1133), rounding type (P1134) and P2167 will also have influence on the JOG ramp.

P1059[3]	JOG frequency left	Min: 0.00	Level 2	
	CStat: CUT	Datatype: Float		Def: 5.00
	P-Group: SETPOINT	Active: Immediately		QuickComm.: No

While JOG left is selected, this parameter determines the frequency at which the inverter will run.

Index:

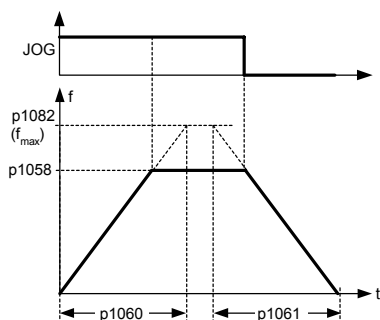
P1059[0] : 1st. Drive data set (DDS)
P1059[1] : 2nd. Drive data set (DDS)
P1059[2] : 3rd. Drive data set (DDS)

Dependency:

P1060 and P1061 set up and down ramp times respectively for jogging.

P1060[3]	JOG ramp-up time	Datatype: Float	Unit: s	Min: 0.00	Level 2
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 10.00	
	P-Group: SETPOINT			Max: 650.00	

Sets jog ramp-up time.
This is the time used while jogging is active.



Index:

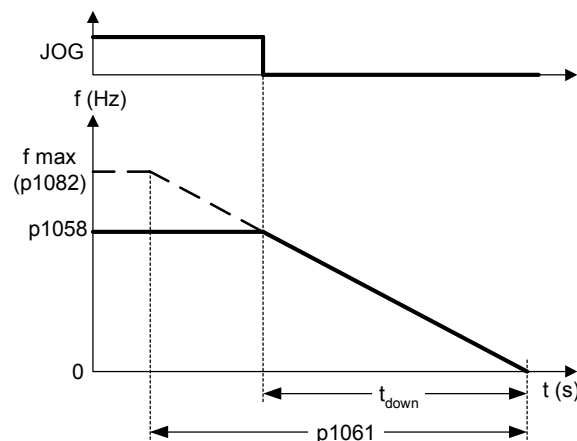
- P1060[0] : 1st. Drive data set (DDS)
- P1060[1] : 2nd. Drive data set (DDS)
- P1060[2] : 3rd. Drive data set (DDS)

Notice:

Ramp times will be used as follows:
 P1060 / P1061 : JOG mode is active
 P1120 / P1121 : Normal mode (ON/OFF) is active
 P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active
 The rounding of P1130 - P1133 also applies to the JOG ramping.

P1061[3]	JOG ramp-down time	Datatype: Float	Unit: s	Min: 0.00	Level 2
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 10.00	
	P-Group: SETPOINT			Max: 650.00	

Sets ramp-down time.
This is the time used while jogging is active.



$$t_{\text{down}} = \frac{p1058}{p1082} \cdot p1061$$

Index:

- P1061[0] : 1st. Drive data set (DDS)
- P1061[1] : 2nd. Drive data set (DDS)
- P1061[2] : 3rd. Drive data set (DDS)

Notice:

Ramp times will be used as follows:
 P1060 / P1061 : JOG mode is active
 P1120 / P1121 : Normal mode (ON/OFF) is active
 P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1070[3]	CI: Main setpoint	Min: 0:0	Level 3
	CStat: CT P-Group: SETPOINT	Datatype: U32 Active: first confirm	
Defines source of main setpoint.			
Index:			
P1070[0] : 1st. Command data set (CDS)			
P1070[1] : 2nd. Command data set (CDS)			
P1070[2] : 3rd. Command data set (CDS)			
P1071[3]	CI: Main setpoint scaling	Min: 0:0	Level 3
	CStat: CT P-Group: SETPOINT	Datatype: U32 Active: first confirm	
Defines source of the main setpoint scaling.			
Index:			
P1071[0] : 1st. Command data set (CDS)			
P1071[1] : 2nd. Command data set (CDS)			
P1071[2] : 3rd. Command data set (CDS)			
P1074[3]	BI: Disable additional setpoint	Min: 0:0	Level 3
	CStat: CUT P-Group: COMMANDS	Datatype: U32 Active: first confirm	
Disables additional setpoint			
Index:			
P1074[0] : 1st. Command data set (CDS)			
P1074[1] : 2nd. Command data set (CDS)			
P1074[2] : 3rd. Command data set (CDS)			
P1075[3]	CI: Additional setpoint	Min: 0:0	Level 3
	CStat: CT P-Group: SETPOINT	Datatype: U32 Active: first confirm	
Defines source of the additional setpoint (to be added to main setpoint).			
Index:			
P1075[0] : 1st. Command data set (CDS)			
P1075[1] : 2nd. Command data set (CDS)			
P1075[2] : 3rd. Command data set (CDS)			
P1076[3]	CI: Additional setpoint scaling	Min: 0:0	Level 3
	CStat: CT P-Group: SETPOINT	Datatype: U32 Active: first confirm	
Defines source of scaling for additional setpoint (to be added to main setpoint).			
Index:			
P1076[0] : 1st. Command data set (CDS)			
P1076[1] : 2nd. Command data set (CDS)			
P1076[2] : 3rd. Command data set (CDS)			
Common Settings:			
1 = Scaling of 1.0 (100%)			
r1078	CO: Total frequency setpoint	Min: -	Level 3
	P-Group: SETPOINT	Datatype: Float Unit: Hz	
Displays sum of main and additional setpoints in [Hz].			

r1079	CO: Selected frequency setpoint	Datatype: Float	Unit: Hz	Min: -	Level 3
	P-Group: SETPOINT			Def: - Max: -	

Displays selected frequency setpoint.

Following frequency setpoints are displayed:

r1078 Total frequency setpoint

P1058 JOG frequency right

P1059 JOG frequency left

Dependency:

P1055 (BI: Enable JOG right) or P1056 (BI: Enable JOG left) define command source of JOG right or JOG left respectively.

Note:

P1055 = 0 and P1056 = 0 ==> Total frequency setpoint is selected.

P1080[3]	Min. frequency			Min: 0.00	Level 1
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 0.00	
	P-Group: SETPOINT	Active: Immediately	QuickComm.: Yes	Max: 650.00	

Sets minimum motor frequency [Hz] at which motor will run irrespective of frequency setpoint. The minimum frequency P1080 represents a masking frequency of 0 Hz for all frequency target value sources e.g.

USS

Thus the frequency band +/- P1080 is run through in optimum time by means of the acceleration/deceleration ramps.

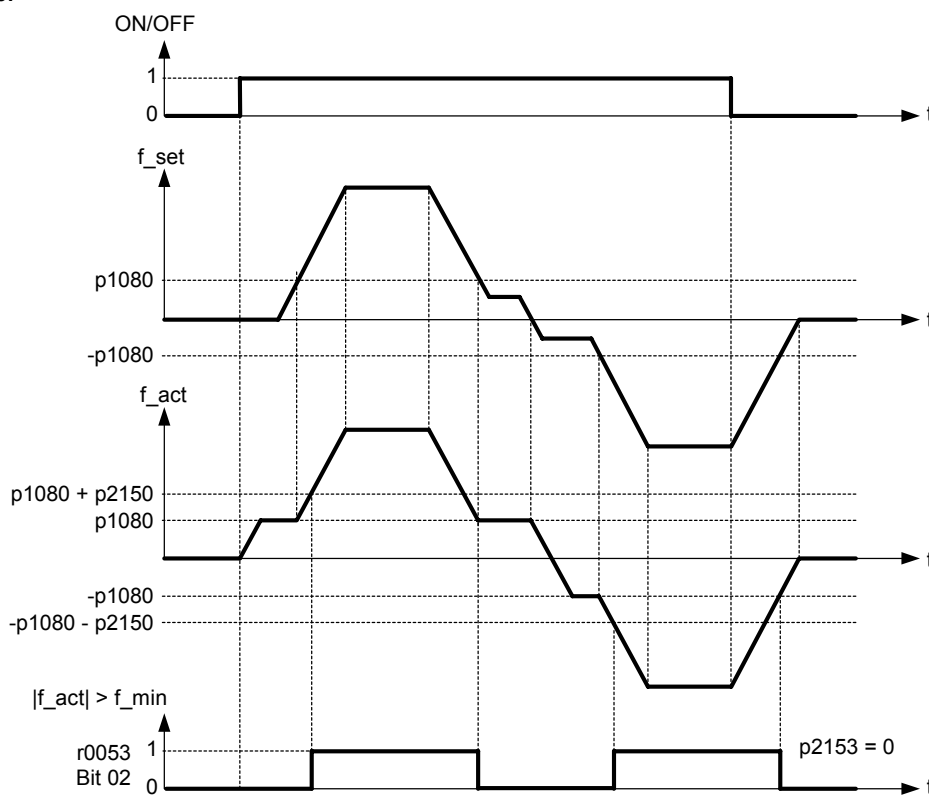
Dwelling in the frequency band is not possible (see example).

Furthermore, an overshoot of the actual frequency f_{act} upper min. frequency P1080 is output by the signal function ($|f_{act}| > f_{min}$, see below).

Index:

- P1080[0] : 1st. Drive data set (DDS)
- P1080[1] : 2nd. Drive data set (DDS)
- P1080[2] : 3rd. Drive data set (DDS)

Example:



Note:

Value set here is valid both for clockwise and for anticlockwise rotation.

Under certain conditions (e.g. ramping, current limiting), motor can run below minimum frequency.

P1082[3]	Max. frequency	Datatype: Float	Unit: Hz	Min: 0.00	Level 1
	CStat: CT	Active: first confirm	QuickComm.: Yes	Def: 50.00	
	P-Group: SETPOINT			Max: 650.00	

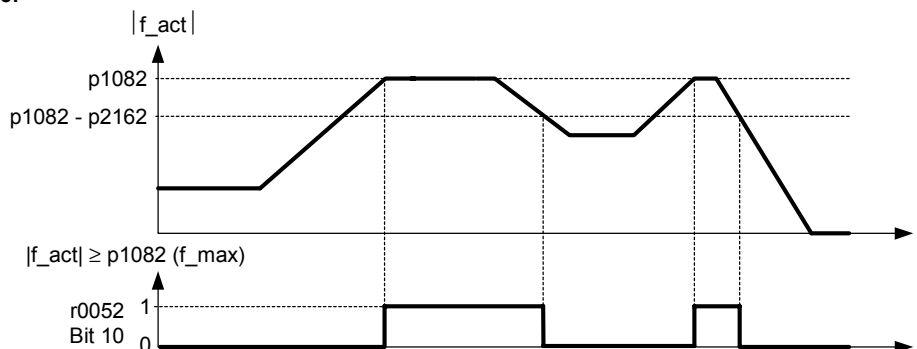
Sets maximum motor frequency [Hz] at which motor will run irrespective of the frequency setpoint. The value set here is valid for both clockwise and anticlockwise rotation.

Futhermore, the monitoring function $|f_{act}| \geq P1082$ (r0052 Bit10, see example below) is affected by this parameter.

Index:

- P1082[0] : 1st. Drive data set (DDS)
- P1082[1] : 2nd. Drive data set (DDS)
- P1082[2] : 3rd. Drive data set (DDS)

Example:



Notice:

Regeneration at rated frequency is only possible, when the maximum frequency (p1082) is higher than the rated frequency of the motor.

Dependency:

The maximal value of motor frequency P1082 is limited to pulse frequency P1800. P1082 is dependent on the derating characteristic as followed:

		p1800			
		2 kHz	4 kHz	6 kHz	8 - 16 kHz
f _{max}	p1082	0 - 133.3 Hz	0 - 266.6 Hz	0 - 400 Hz	0 - 650 Hz

The maximum output frequency of inverter can be exceeded if one of the following is active:

- p1335 ≠ 0 (Slip compensation active) :

$$f_{max}(p1335) = f_{max} + f_{slip,max} = p1082 + \frac{p1336}{100} \cdot \frac{r0330}{100} \cdot p0310$$

- p1200 ≠ 0 (Flying restart active) :

$$f_{max}(p1200) = f_{max} + 2 \cdot f_{slip,nom} = p1082 + 2 \cdot \frac{r0330}{100} \cdot p0310$$

The resultant value is displayed in r1084 (resultant maximum frequency).

Note:

When using the setpoint source

- USS
- Fieldbus

the setpoint frequency (in Hz) is cyclically calculated using a hexadecimal value (e.g. for the USS r2018[1]) and the reference frequency P2000.

When Regenerating at Max Frequency it is possible that the Frequency will go above this value by the amount specified in P1253. If this is unacceptable change P1253 to 0, or change load so that regeneration is at acceptable limits.

P1084	Resultant max. frequency	Datatype: Float	Unit: Hz	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays resultant maximum frequency.

P1300 < 20

$$P1800 \leq 6 \text{ kHz} \rightarrow r1084 = \min(P1082, \frac{P1800}{15}, 650.00)$$

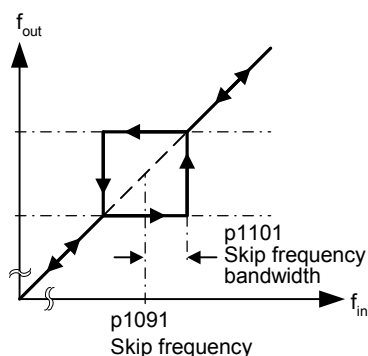
$$P1800 \geq 8 \text{ kHz} \rightarrow r1084 = \min(P1082, 650.00)$$

p1300 ≥ 20

$$r1084 = \min(p1082, 5 \cdot p0310, 200.00)$$

P1091[3]	Skip frequency	Datatype: Float	Unit: Hz	Min: 0.00	Level 3
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 0.00 Max: 650.00	

Defines skip frequency 1 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).



Index:

- P1091[0] : 1st. Drive data set (DDS)
- P1091[1] : 2nd. Drive data set (DDS)
- P1091[2] : 3rd. Drive data set (DDS)

Notice:

Stationary operation is not possible within the suppressed frequency range; the range is merely passed through (on the ramp).
For example, if P1091 = 10 Hz and P1101 = 2 Hz, it is not possible to operate continuously between 10 Hz +/- 2 Hz (i.e. between 8 and 12 Hz).

Note:

The function is disabled if P1091 = 0.

P1092[3]	Skip frequency 2	Datatype: Float	Unit: Hz	Min: 0.00	Level 3
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 0.00 Max: 650.00	

Defines skip frequency 2 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).

Index:

- P1092[0] : 1st. Drive data set (DDS)
- P1092[1] : 2nd. Drive data set (DDS)
- P1092[2] : 3rd. Drive data set (DDS)

Details:

See P1091 (skip frequency 1).

P1093[3]	Skip frequency 3	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm.: No	Min: 0.00 Def: 0.00 Max: 650.00	Level 3
Defines skip frequency 3 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).						
Index: P1093[0] : 1st. Drive data set (DDS) P1093[1] : 2nd. Drive data set (DDS) P1093[2] : 3rd. Drive data set (DDS)						
Details: See P1091 (skip frequency 1).						
P1094[3]	Skip frequency 4	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm.: No	Min: 0.00 Def: 0.00 Max: 650.00	Level 3
Defines skip frequency 4 which avoids effects of mechanical resonance and suppresses frequencies within +/- P1101 (skip frequency bandwidth).						
Index: P1094[0] : 1st. Drive data set (DDS) P1094[1] : 2nd. Drive data set (DDS) P1094[2] : 3rd. Drive data set (DDS)						
Details: See P1091 (skip frequency 1).						
P1101[3]	Skip frequency bandwidth	CStat: CUT P-Group: SETPOINT	Datatype: Float Active: Immediately	Unit: Hz QuickComm.: No	Min: 0.00 Def: 2.00 Max: 10.00	Level 3
Delivers frequency bandwidth to be applied to skip frequencies (in [Hz]).						
Index: P1101[0] : 1st. Drive data set (DDS) P1101[1] : 2nd. Drive data set (DDS) P1101[2] : 3rd. Drive data set (DDS)						
Details: See P1091 (skip frequency 1).						
P1110[3]	BI: Inhibit neg. freq. setpoint	CStat: CT P-Group: COMMANDS	Datatype: U32 Active: first confirm	Unit: - QuickComm.: No	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
This parameter suppresses negative setpoints. Therefore, modification of the motor direction is inhibited to the setpoint channel.						
If a min. frequency (P1080) and a negative setpoint are given, the motor is accelerated by a positive value in relationship to the min. frequency.						
Index: P1110[0] : 1st. Command data set (CDS) P1110[1] : 2nd. Command data set (CDS) P1110[2] : 3rd. Command data set (CDS)						
Common Settings: 0 = Disabled 1 = Enabled						
P1113[3]	BI: Reverse	CStat: CT P-Group: COMMANDS	Datatype: U32 Active: first confirm	Unit: - QuickComm.: No	Min: 0:0 Def: 2090:11 Max: 40000:0	Level 3
Defines source of reverse command used when P0719 = 0 (Auto selection of command/setpoint source).						
Index: P1113[0] : 1st. Command data set (CDS) P1113[1] : 2nd. Command data set (CDS) P1113[2] : 3rd. Command data set (CDS)						
r1114	CO: Freq. setp. after dir. ctrl.	P-Group: SETPOINT	Datatype: Float	Unit: Hz	Min: - Def: - Max: -	Level 3
Displays setpoint frequency after change of direction.						

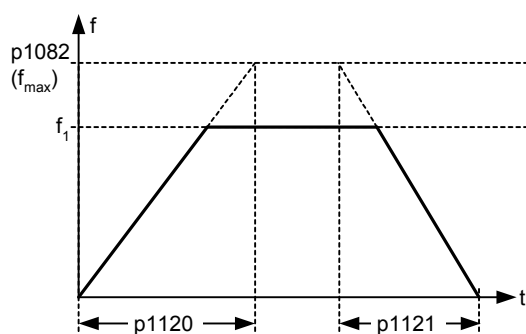
r1119	CO: Freq. setpoint before RFG	Datatype: Float	Unit: Hz	Min: - Def: - Max: -	Level 3
P-Group: SETPOINT					

Displays output frequency after modification by other functions, e.g.:

- P1110 BI: Inhibit neg. freq. setpoint,
- P1091 - P1094 skip frequencies,
- P1080 Min. frequency,
- P1082 Max. frequency,
- limitations,
- etc.

P1120[3]	Ramp-up time	Datatype: Float	Unit: s	Min: 0.00 Def: 10.00 Max: 650.00	Level 1
CStat: CUT					
P-Group: SETPOINT					
Active: first confirm					
QuickComm.: Yes					

Time taken for motor to accelerate from standstill up to maximum motor frequency (P1082) when no rounding is used.



Setting the ramp-up time too short can cause the inverter to trip (overcurrent F0001).

Index:

- P1120[0] : 1st. Drive data set (DDS)
- P1120[1] : 2nd. Drive data set (DDS)
- P1120[2] : 3rd. Drive data set (DDS)

Notice:

Ramp times will be used as follows:

- P1060 / P1061 : JOG mode is active
- P1120 / P1121 : Normal mode (ON/OFF) is active
- P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

Dependency:

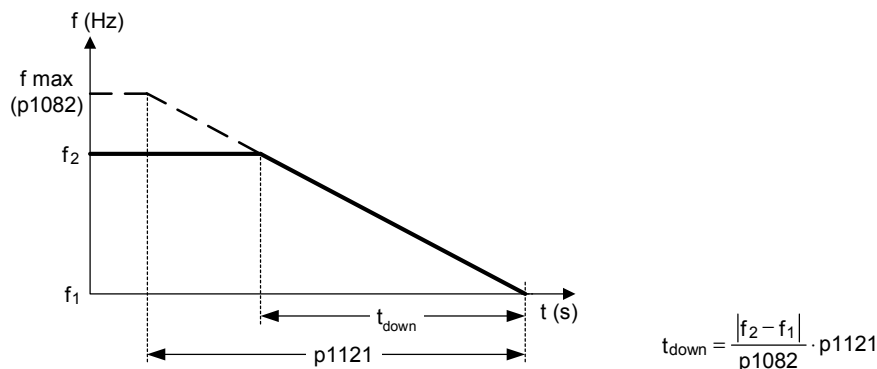
Rounding times (P1130 - P1133) and rounding type (P1134) will also have influence on the ramp.

Note:

If an external frequency setpoint with set ramp rates is used (e.g. from a PLC). The best way to achieve optimum drive performance is to set ramp times in P1120 and P1121 slightly shorter than those of the PLC.

P1121[3]	Ramp-down time	Datatype: Float	Unit: s	Min: 0.00	Level 1
	CStat: CUT	Active: first confirm	QuickComm.: Yes	Def: 10.00	
	P-Group: SETPOINT			Max: 650.00	

Time taken for motor to decelerate from maximum motor frequency (P1082) down to standstill when no rounding is used.



Index:

- P1121[0] : 1st. Drive data set (DDS)
- P1121[1] : 2nd. Drive data set (DDS)
- P1121[2] : 3rd. Drive data set (DDS)

Notice:

Setting the ramp-down time too short can cause the inverter to trip (overcurrent F0001 / overvoltage F0002).

Ramp times will be used as follows:

- P1060 / P1061 : JOG mode is active
- P1120 / P1121 : Normal mode (ON/OFF) is active
- P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1124[3]	BI: Enable JOG ramp times	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: COMMANDS			Max: 40000:0	

Defines source for switching between jog ramp times (P1060, P1061) and normal ramp times (P1120, P1121) as applied to the RFG.

This parameter is valid for normal mode (ON/OFF) only.

Index:

- P1124[0] : 1st. Command data set (CDS)
- P1124[1] : 2nd. Command data set (CDS)
- P1124[2] : 3rd. Command data set (CDS)

Notice:

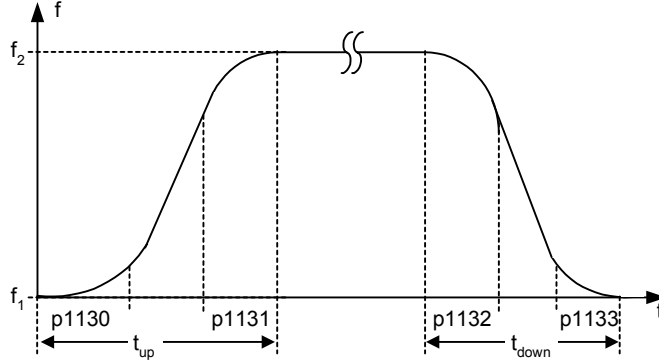
P1124 does not have any impact when JOG mode is selected. In this case, jog ramp times (P1060, P1061) will be used all the time.

Ramp times will be used as follows:

- P1060 / P1061 : JOG mode is active
- P1120 / P1121 : Normal mode (ON/OFF) is active
- P1060 / P1061 : Normal mode (ON/OFF) and P1124 is active

P1130[3]	Ramp-up initial rounding time			Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.00	
	P-Group: SETPOINT	Active: first confirm	QuickComm.: No	Max: 40.00	

Defines rounding time in seconds as shown on the diagram below.



where:

Dependency	Ramp-up time	Ramp-down time
always for $ f_2 - f_1 = p1082$	$t_{up} = \frac{p1130 + p1131}{2} + p1120$	$t_{down} = \frac{p1132 + p1133}{2} + p1121$
for $\frac{p1130 + p1131}{2} > p1120$ and $\frac{p1132 + p1133}{2} > p1121$	$t_{up} = \left(\frac{p1130 + p1131}{2} + p1120\right) \cdot \sqrt{\frac{ f_2 - f_1 }{p1082}}$	$t_{down} = \left(\frac{p1132 + p1133}{2} + p1121\right) \cdot \sqrt{\frac{ f_2 - f_1 }{p1082}}$
for $\frac{p1130 + p1131}{2} \leq p1120$ and $\frac{p1132 + p1133}{2} \leq p1121$	$t_{up} = \frac{p1130 + p1131}{2} + p1120 \cdot \frac{ f_2 - f_1 }{p1082}$	$t_{down} = \frac{p1132 + p1133}{2} + p1121 \cdot \frac{ f_2 - f_1 }{p1082}$

Index:

- P1130[0] : 1st. Drive data set (DDS)
- P1130[1] : 2nd. Drive data set (DDS)
- P1130[2] : 3rd. Drive data set (DDS)

Notice:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

Note:

If short or zero ramp times (P1120, P1121 < P1130, P1131, P1132, P1133) are set, the total ramp up time (t_{up}) or ramp down time (t_{down}) will not depend on P1130. See equations above for valid conditions to calculate t_{up} and t_{down}.

P1131[3]	Ramp-up final rounding time			Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.00	
	P-Group: SETPOINT	Active: first confirm	QuickComm.: No	Max: 40.00	

Defines rounding time at end of ramp-up as shown in P1130 (ramp-up initial rounding time).

Index:

- P1131[0] : 1st. Drive data set (DDS)
- P1131[1] : 2nd. Drive data set (DDS)
- P1131[2] : 3rd. Drive data set (DDS)

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

P1132[3]	Ramp-down initial rounding time				Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.00		
	P-Group: SETPOINT	Active: first confirm	QuickComm.: No	Max: 40.00		

Defines rounding time at start of ramp-down as shown in P1130 (ramp-up initial rounding time).

Index:

P1132[0] : 1st. Drive data set (DDS)
P1132[1] : 2nd. Drive data set (DDS)
P1132[2] : 3rd. Drive data set (DDS)

Note:

Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

P1133[3]	Ramp-down final rounding time				Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.00		
	P-Group: SETPOINT	Active: first confirm	QuickComm.: No	Max: 40.00		

Defines rounding time at end of ramp-down as shown in P1130 (ramp-up initial rounding time).

Index:

P1133[0] : 1st. Drive data set (DDS)
P1133[1] : 2nd. Drive data set (DDS)
P1133[2] : 3rd. Drive data set (DDS)

Note:

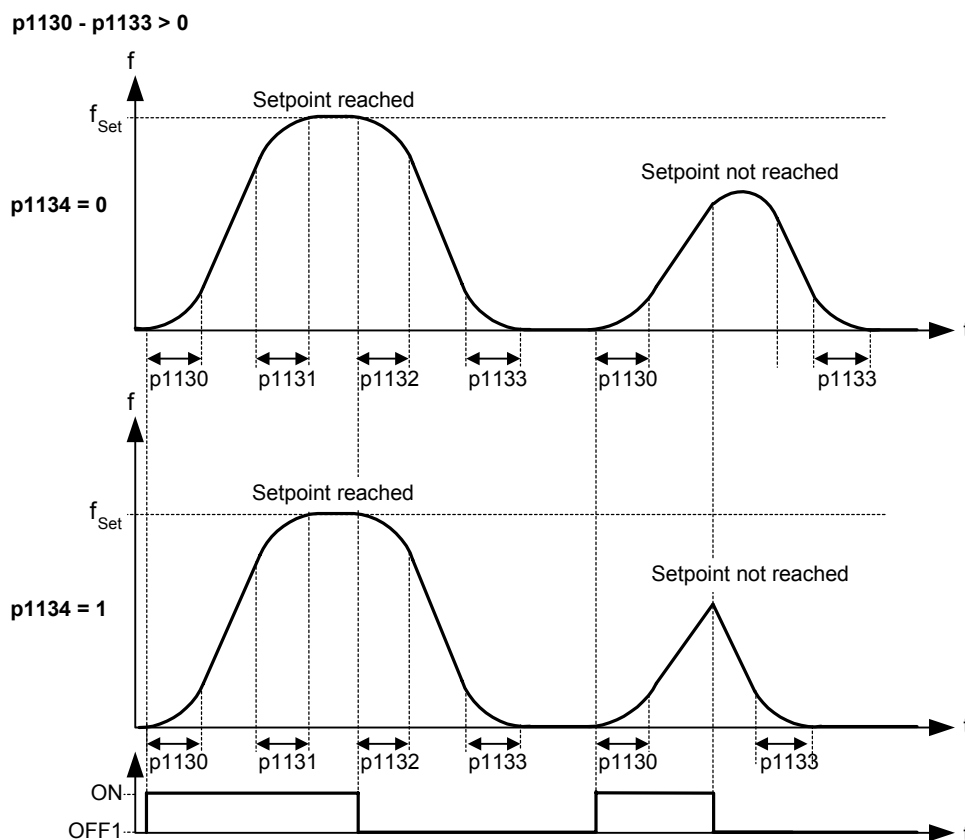
Rounding times are recommended, since they prevent an abrupt response, thus avoiding detrimental effects on the mechanics.

P1134[3]	Rounding type				Min: 0	Level 2
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: SETPOINT	Active: Immediately	QuickComm.: No	Max: 1		

Defines the smoothing which is active by setpoint modifications during acceleration or deceleration (e.g. new setpoint, OFF1, OFF3, REV).

This smoothing is applied, if the motor is ramped-up or ramped-down and

- P1134 = 0,
- P1132 > 0, P1133 > 0 and
- the setpoint is not yet reached.



Possible Settings:

- 0 Continuous smoothing
- 1 Discontinuous smoothing

Index:

- P1134[0] : 1st. Drive data set (DDS)
- P1134[1] : 2nd. Drive data set (DDS)
- P1134[2] : 3rd. Drive data set (DDS)

Dependency:

No effect until P1130 (Ramp-up initial rounding time) or P1131 (Ramp-up final rounding time) or P1132 (Ramp-down initial rounding time) or P1133 (Ramp-down final rounding time) > 0 s.

P1135[3]	OFF3 ramp-down time	Min: 0.00	Level
	CStat: CUT	Datatype: Float	Unit: s
	P-Group: SETPOINT	Active: first confirm	QuickComm.: Yes
		Def: 5.00	2
		Max: 650.00	

Defines ramp-down time from maximum frequency to standstill for OFF3 command.

Index:

- P1135[0] : 1st. Drive data set (DDS)
- P1135[1] : 2nd. Drive data set (DDS)
- P1135[2] : 3rd. Drive data set (DDS)

P1140[3]	BI: RFG enable	Min: 0:0	Level
	CStat: CT	Datatype: U32	Unit: -
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No
		Def: 1:0	3
		Max: 40000:0	

Defines command source of RFG enable command (RFG: ramp function generator). If binary input is equal to zero than the RFG output will be set immediately to 0.

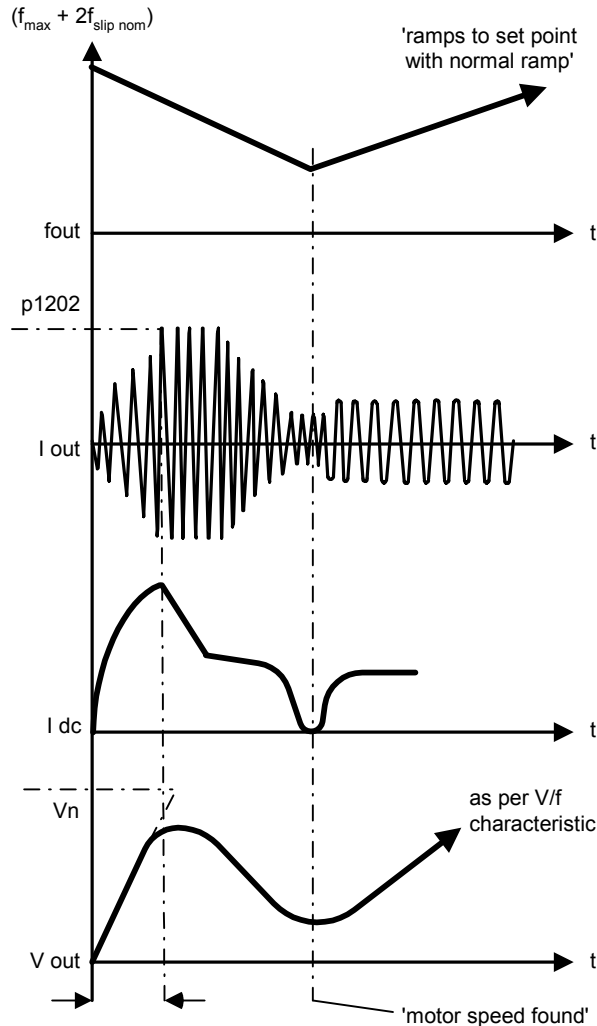
Index:

- P1140[0] : 1st. Command data set (CDS)
- P1140[1] : 2nd. Command data set (CDS)
- P1140[2] : 3rd. Command data set (CDS)

P1141[3]	BI: RFG start	Min: 0:0	Level 3
	CStat: CT P-Group: COMMANDS Datatype: U32 Active: first confirm Unit: - QuickComm.: No Def: 1:0 Max: 40000:0		
	Defines command source of RFG start command (RFG: ramp function generator). If binary input is equal to zero than the RFG output is held at it present value.		
	Index: P1141[0] : 1st. Command data set (CDS) P1141[1] : 2nd. Command data set (CDS) P1141[2] : 3rd. Command data set (CDS)		
P1142[3]	BI: RFG enable setpoint	Min: 0:0	Level 3
	CStat: CT P-Group: COMMANDS Datatype: U32 Active: first confirm Unit: - QuickComm.: No Def: 1:0 Max: 40000:0		
	Defines command source of RFG enable setpoint command (RFG: ramp function generator). If binary input is equal to zero than the RFG input will be set to zero and the RFG output will be ramp-down to zero.		
	Index: P1142[0] : 1st. Command data set (CDS) P1142[1] : 2nd. Command data set (CDS) P1142[2] : 3rd. Command data set (CDS)		
r1170	CO: Frequency setpoint after RFG	Min: -	Level 3
	Datatype: Float Unit: Hz Def: - Max: - P-Group: SETPOINT		
	Displays overall frequency setpoint after ramp generator.		

P1200	Flying start	Datatype: U16	Unit: -	Min: 0	Level 2
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0	
	P-Group: FUNC			Max: 6	

Starts inverter onto a spinning motor by rapidly changing the output frequency of the inverter until the actual motor speed has been found. Then, the motor runs up to setpoint using the normal ramp time.



Possible Settings:

- 0 Disabled
- 1 Always
- 2 Fault/OFF2/Power on
- 3 Fault/OFF2
- 4 Always, setpoint direction only
- 5 Fault/OFF2/Pow on, setp dir only
- 6 Fault/OFF2, setp. direction only

Notice:

Flying start must be used in cases where the motor may still be turning (e.g. after a short mains break) or can be driven by the load. Otherwise, overcurrent trips will occur.

Note:

Useful for motors with high inertia loads.

Settings 1 to 3 search in both directions.
Settings 4 to 6 search only in direction of setpoint.

P1202[3]	Motor-current: Flying start	Min: 10	Level 3	
	CStat: CUT	Datatype: U16		Unit: %
	P-Group: FUNC	Active: first confirm		QuickComm.: No
		Def: 100		
		Max: 200		

Defines search current used for flying start.

Value is in [%] based on rated motor current (P0305).

Index:

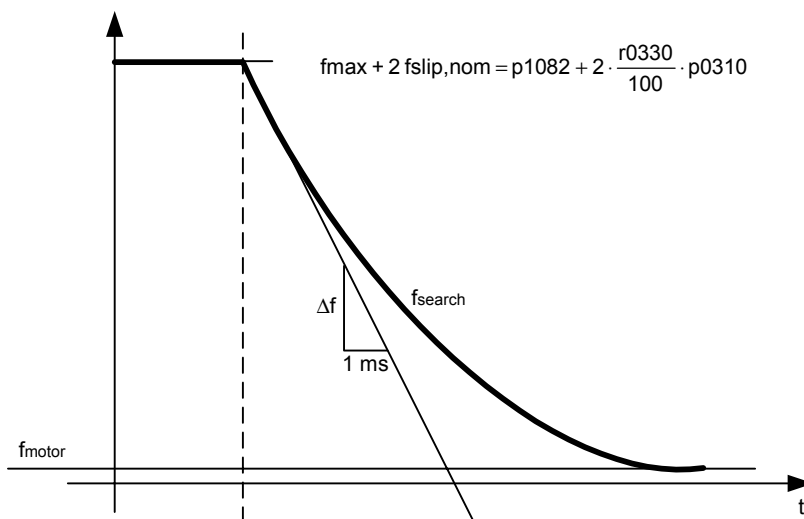
- P1202[0] : 1st. Drive data set (DDS)
- P1202[1] : 2nd. Drive data set (DDS)
- P1202[2] : 3rd. Drive data set (DDS)

Note:

Reducing the search current may improve performance for flying start if the inertia of the system is not very high.

P1203[3]	Search rate: Flying start	Min: 10	Level 3	
	CStat: CUT	Datatype: U16		Unit: %
	P-Group: FUNC	Active: first confirm		QuickComm.: No
		Def: 100		
		Max: 200		

Sets factor by which the output frequency changes during flying start to synchronize with turning motor. This value is entered in [%] defines the reciprocal initial gradient in the search sequence (see curve below). Parameter P1203 influences the time taken to search for the motor frequency.



$$p1203 [\%] = \frac{\Delta t [\text{ms}]}{\Delta f [\text{Hz}]} \cdot \frac{f_{\text{slip,nom}} [\text{Hz}]}{1 [\text{ms}]} \cdot 2 [\%] \Rightarrow \Delta f = \frac{2 [\%]}{p1203 [\%]} \cdot \frac{r0330}{100} \cdot p0310$$

The search time is the time taken to search through all frequencies between max. frequency P1082 + 2 x f_slip to 0 Hz.

P1203 = 100 % is defined as giving a rate of 2 % of f_slip,nom / [ms].

P1203 = 200 % would result in a rate of frequency change of 1 % of f_slip,nom / [ms].

Index:

- P1203[0] : 1st. Drive data set (DDS)
- P1203[1] : 2nd. Drive data set (DDS)
- P1203[2] : 3rd. Drive data set (DDS)

Example:

For a motor with 50 Hz, 1350 rpm, 100 % would produce a maximum search time of 600 ms.

Note:

A higher value produces a flatter gradient and thus a longer search time. A lower value has the opposite effect.

r1204	Status word: Flying start V/f	Datatype: U16	Unit: -	Min: -	Level 4
	P-Group: FUNC			Def: - Max: -	

Bit parameter for checking and monitoring states during search, if V/f control mode is selected (see P1300).

Bitfields:

Bit00	Current applied	0	No	1	Yes
Bit01	Current could not be applied	0	No	1	Yes
Bit02	Voltage reduced	0	No	1	Yes
Bit03	Slope-filter started	0	No	1	Yes
Bit04	Current less threshold	0	No	1	Yes
Bit05	Current-minimum	0	No	1	Yes
Bit07	Speed could not be found	0	No	1	Yes

r1205	Status word: Flying start SLVC	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: FUNC			Def: - Max: -	

Bit parameter for checking status of flying start performed with n-adaption of observer.
Parameter is only valid, if sensorless vector control (SLVC) is selected (see P1300).

Bitfields:

Bit00	Transformation active	0	No	1	Yes
Bit01	Initialize n-adaption	0	No	1	Yes
Bit02	Current applying	0	No	1	Yes
Bit03	N-controller closed	0	No	1	Yes
Bit04	Isd-controller open	0	No	1	Yes
Bit05	RFG hold	0	No	1	Yes
Bit06	N-adaption set to zero	0	No	1	Yes
Bit07	reserved	0	No	1	Yes
Bit08	reserved	0	No	1	Yes
Bit09	reserved	0	No	1	Yes
Bit10	Direction Positive	0	No	1	Yes
Bit11	Search is started	0	No	1	Yes
Bit12	Current is applied	0	No	1	Yes
Bit13	Search is aborted	0	No	1	Yes
Bit14	Deviation is zero	0	No	1	Yes
Bit15	N-controller is active	0	No	1	Yes

P1210	Automatic restart			Min: 0	Level 2
	CStat: CUT	Datatype: U16	Unit: -	Def: 1	
	P-Group: FUNC	Active: first confirm	QuickComm.: No	Max: 6	

Configures automatic restart function

Possible Settings:

0	Disabled
1	Trip reset after power on
2	Mains blackout
3	Mains brownout or fault, P1211
4	Mains brownout, P1211
5	Mains blackout and fault
6	Mains brown-blackout or fault

Notice:

A "mains brownout" is a mains break, regarding the 400 V for the power module.

A "mains blackout" is mains break, regarding the 24 V for the control unit.

"Delay Time" is the time between attempts of quitting fault.

The "Delay Time" of first attempt is 1 second, then it will be double every next attempt.

"Number of Restart Attempts" is the number of restarts the inverter will try to quit fault.

When faults are quit and after 4 seconds of no fault condition, "Number of Restart Attempts" will be reset to P1211 and "Delay Time" will be reset to 1 second.

P1210 = 0:

Automatic restart is disabled.

P1210 = 1:

The inverter will acknowledge (reset) faults i.e. it will reset a fault when the is re-applied.
This means the inverter must be fully powered down, a brownout is not sufficed.
The inverter will not run until the ON command has been toggled.

P1210 = 2:

The inverter will acknowledge the fault F0003 at power on after blackout and restarts the drive.
A permanent ON command must be present from control word.

P1210 = 3:

For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the faults (F0003, etc.).

The inverter will acknowledge the fault and restarts the drive after a blackout or brownout.
A permanent ON command must be present from control word.

P1210 = 4:

For these settings it is fundamental that the drive only restarts if it has been in a RUN state at the time of the fault (F0003).

The inverter will acknowledge the fault and restarts the drive after a blackout or brownout.
A permanent ON command must be present from control word.

P1210 = 5:

The inverter will acknowledge the faults F0003 etc. at power on after blackout and restarts the drive.
A permanent ON command must be present from control word.

P1210 = 6:

The inverter will acknowledge the faults (F0003 etc.) at power on after blackout or brownout and restarts the drive.

A permanent ON command must be present from control word.

Setting 6 causes the motor to restart immediately.

Following table presents an overview of parameter P1210 and its functionality.

p1210	ON always active (permanent)				ON in no-voltage condition	
	Fault F0003 on Blackout	Brownout	All other faults on Blackout	Brownout	All faults on Blackout	No faults on Blackout
0	–	–	–	–	–	–
1	Fault acknowl.	–	Fault acknowl.	–	Fault acknowl.	–
2	Fault acknowl. + restart	–	–	–	–	Restart
3	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	–
4	Fault acknowl. + restart	Fault acknowl. + restart	–	–	–	–
5	Fault acknowl. + restart	–	Fault acknowl. + restart	–	Fault acknowl. + restart	Restart
6	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Fault acknowl. + restart	Restart

Flying start must be used in cases where the motor may still be turning (e.g. after a short mains break) or can be driven by the load (P1200).

Dependency:

Automatic restart requires constant ON command.



Caution:

P1210 > 2 can cause the motor to restart automatically without toggling the ON command !

P1211	Number of restart attempts	Min: 0	Level 3	
	CStat: CUT	Datatype: U16		Def: 3
	P-Group: FUNC	Active: first confirm		QuickComm.: No Max: 10

Specifies number of times inverter will attempt to restart if automatic restart P1210 is activated.

P1215	Holding brake enable	Min: 0	Level 2	
	CStat: CT	Datatype: U16		Def: 0
	P-Group: FUNC	Active: first confirm		QuickComm.: No Max: 1

Enables/disables holding brake function. Details see Operating Instructions ET 200S FC.

Possible Settings:

- 0 Motor holding brake disabled
- 1 Motor holding brake enabled

Note:

In V/f control (P1300 < 20) a typical value of min. frequency P1080 for motor holding brake is the slip frequency of the motor r0330.

In a vector control mode (P1300 = 20 or P1300 = 21)

- The value of the min. Frequency P1080 should be zero.
- The delay speed loss reaction should be > brake holding times (i.e. P0494 > P1216 and P494 > P1217)
- The delay time for motor pulled out should be > brake holding times (i.e. P2178 > P1216 and P2178 > P1217)

Otherwise there may be encoder loss trips when the brake is applied and pulses are enabled.



Caution:

With safety units the motor holding brake will be closed as soon as a Safe Stop becomes active - even if the motor holding brake is disabled via p1215.

It is not permissible to use the motor holding brake as working brake, as it is generally only designed for a limited number of emergency braking operations.

P1216	Holding brake release delay	Min: 0.0	Level 2	
	CStat: CT	Datatype: Float		Def: 1.0
	P-Group: FUNC	Active: first confirm		QuickComm.: No Max: 20.0

Defines period during which inverter runs at min. frequency P1080 before ramping up. Details see Operating Instructions ET 200S FC.

Note:

A typical value of min. frequency P1080 for this type of application is the slip frequency of the motor.

You can calculate the rated slip frequency by using the following formula:

$$f_{\text{Slip}}[\text{Hz}] = \frac{r0330}{100} \cdot p0310 = \frac{n_{\text{syn}} - n_n}{n_{\text{syn}}} \cdot f_n$$

Details:

See Operating Instructions ET 200S FC.

P1217	Holding time after ramp down	Min: 0.0	Level 2	
	CStat: CT	Datatype: Float		Def: 1.0
	P-Group: FUNC	Active: first confirm		QuickComm.: No Max: 20.0

Defines time for which inverter runs at minimum frequency (P1080) after ramping down.

Details:

See Operating Instructions ET 200S FC.

P1253[3]	Vdc-controller or I-max regen c				Min: 0.00	Level 3
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 10.00		
	P-Group: FUNC	Active: Immediately	QuickComm.: No	Max: 600.00		

Limits maximum effect of vdc controller or I-max controller when regenerating (not for V/f control and SLVC).

Index:

- P1253[0] : 1st. Drive data set (DDS)
- P1253[1] : 2nd. Drive data set (DDS)
- P1253[2] : 3rd. Drive data set (DDS)

Note:

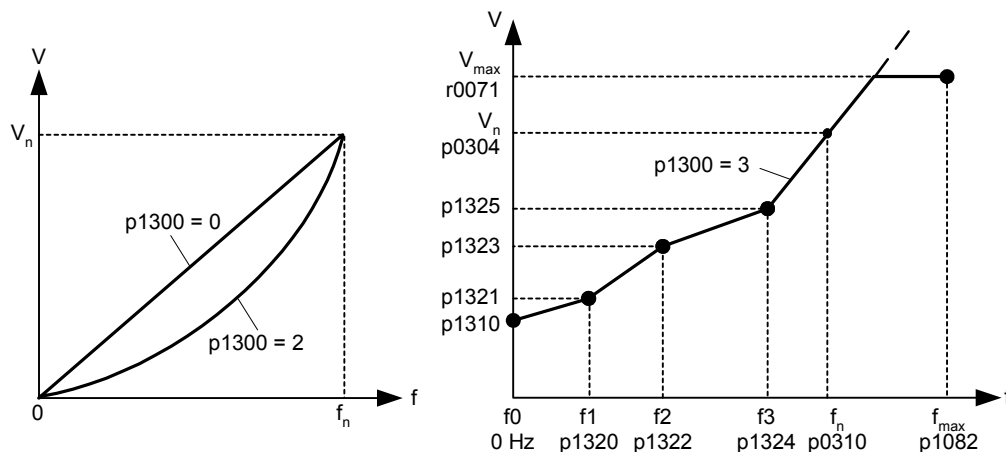
When Regenerating at nominal or maximum Frequency it is possible that the output frequency will go above P1082 by the amount specified in this parameter. If this is unacceptable then the following is possible

- reduce the maximum frequency P1082 or
- reduce P1253 to 0 or
- make appropriate changes to the load to stop regeneration at maximum frequency.

P1300[3]	Control mode				Min: 0	Level 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: CONTROL	Active: first confirm	QuickComm.: Yes	Max: 23		

Parameter to select the control methode.

Controls relationship between speed of motor and voltage supplied by inverter as illustrated in the diagram below.



Possible Settings:

- 0 V/f with linear charac.
- 1 V/f with FCC
- 2 V/f with quadratic charac.
- 3 V/f with programmable charac.
- 4 reserved
- 5 V/f for textile applications
- 6 V/f with FCC for textile appl.
- 19 V/f with independent volt. setp.
- 20 Sensorless vector control
- 21 Vector control with sensor
- 22 Sensorless vector torque-control
- 23 Vector torque-control & sensor

Index:

- P1300[0] : 1st. Drive data set (DDS)
- P1300[1] : 2nd. Drive data set (DDS)
- P1300[2] : 3rd. Drive data set (DDS)

Note:

P1300 = 1 : V/f with FCC (flux current control)

- Maintains motor flux current for improved efficiency.
- If FCC is chosen, linear V/f is active at low frequencies.

P1300 = 2 : V/f with a quadratic characteristic

- Suitable for centrifugal fans / pumps

P1300 = 3 : V/f with a programmable characteristic

- User defined characteristic (see P1320)
- For synchronous motors (e.g. SIEMOSYN motors)

P1300 = 5,6 : V/f for textil applications

- Slip compensation disabled.
- I_{max} controller modifies the output voltage only.
- I_{max} controller does not influence the output frequency.

P1300 = 19 : V/f control with independent voltage setpoint

The following table presents an overview of control parameters (V/f) that can be modify in relationship to P1300 dependencies:

ParNo.	Parameter name	Level	V/f							SLVC		VC	
			p1300 =										
			0	1	2	3	5	6	19	20	22	21	23
p1300[3]	Control mode	2	x	x	x	x	x	x	x	x	x	x	x
p1310[3]	Continuous boost	2	x	x	x	x	x	x	x	-	-	-	-
p1311[3]	Acceleration boost	2	x	x	x	x	x	x	x	-	-	-	-
p1312[3]	Starting boost	2	x	x	x	x	x	x	x	-	-	-	-
p1316[3]	Boost end frequency	3	x	x	x	x	x	x	x	-	-	-	-
p1320[3]	Programmable V/f freq. coord. 1	3	-	-	-	x	-	-	-	-	-	-	-
p1321[3]	Programmable V/f volt. coord. 1	3	-	-	-	x	-	-	-	-	-	-	-
p1322[3]	Programmable V/f freq. coord. 2	3	-	-	-	x	-	-	-	-	-	-	-
p1323[3]	Programmable V/f volt. coord. 2	3	-	-	-	x	-	-	-	-	-	-	-
p1324[3]	Programmable V/f freq. coord. 3	3	-	-	-	x	-	-	-	-	-	-	-
p1325[3]	Programmable V/f volt. coord. 3	3	-	-	-	x	-	-	-	-	-	-	-
p1330[3]	Cl: Voltage setpoint	3	-	-	-	-	-	-	x	-	-	-	-
p1333[3]	Start frequency for FCC	3	-	x	-	-	-	x	-	-	-	-	-
p1335[3]	Slip compensation	2	x	x	x	x	-	-	-	-	-	-	-
p1336[3]	CO: U/f Slip limit	2	x	x	x	x	-	-	-	-	-	-	-
p1338[3]	Resonance damping gain V/f	3	x	x	x	x	-	-	-	-	-	-	-
p1340[3]	I _{max} freq. controller prop. gain	3	x	x	x	x	x	x	x	-	-	-	-
p1341[3]	I _{max} controller integral time	3	x	x	x	x	x	x	x	-	-	-	-
p1345[3]	I _{max} controller prop. gain	3	x	x	x	x	x	x	x	-	-	-	-
p1346[3]	I _{max} voltage ctrl. integral time	3	x	x	x	x	x	x	x	-	-	-	-
p1350[3]	Voltage soft start	3	x	x	x	x	x	x	x	-	-	-	-

Sensorless vector control (SLVC, P1300 = 20,22) and vector control (VC, P1300 = 21,23):

SLVC can provide excellent performance for the following types of application:

- Applications which require high torque performance
- Applications which require fast respond to shock loading
- Applications which require torque holding while passing through 0 Hz
- Applications which require very accurate speed holding
- Applications which require motor pull out protection

Restrictions:

SLVC / VC is dependent on the accuracy of the motor model being used and the measurements being performed by the inverter.

There are therefore certain restrictions on the use of SLVC / VC:

- $f_{\max} = \min(200 \text{ Hz}, 5 \cdot p0310)$ (max. frequency)
- $\frac{1}{4} \leq \frac{p0305}{r0207} \leq \frac{r0209}{r0207}$ (ratio of rated motor current to rated inverter current)
- no synchronous motor

Recommended means of commissioning:

For correct operation under SLVC / VC control it is imperative that the name plate data of the motor (P0304 - P0310) is correctly entered and that the motor data identification (P1910) must be carried out on a cold motor.

It is also necessary to ensure that the motor ambient temperature is correctly entered in P0625 if this is significantly different from the default value of 20°C.

This must be done after the quick commissioning has been completed (P3900) but before the motor data identification measurements are carried out.

Optimisation:

The following parameters can be adjusted by the user to improve performance.

- P0003 = 3
- P0342: Total / motor inertia ratio

Sensorless Vector Control (SLVC):

- P1470: P gain (SLVC)
- P1472: I term (SLVC)
- P1610: Continuous torque boost (SLVC, open loop boost)
- P1750: Control word of motor model

Vector Control (VC):

- P1460: P gain
- P1462: I term

The following table presents an overview of control parameters (SLVC, VC) that can be modify in relationship to P1300 dependencies:

ParNo.	Parameter name	Level	V/f							SLVC	VC		
			p1300 =										
			0	1	2	3	5	6	19	20	22	21	23
p1400[3]	Configuration of speed control	3	-	-	-	-	-	-	-	-	-	x	-
p1442[3]	Filter time for act. speed	3	-	-	-	-	-	-	-	-	-	x	-
p1452[3]	Filter time for act.speed (SLVC)	3	-	-	-	-	-	-	-	x	-	-	-
p1460[3]	Gain speed controller	2	-	-	-	-	-	-	-	-	-	x	-
p1462[3]	Integral time speed controller	2	-	-	-	-	-	-	-	-	-	x	-
p1470[3]	Gain speed controller (SLVC)	2	-	-	-	-	-	-	-	x	-	-	-
p1472[3]	Integral time n-ctrl. (SLVC)	2	-	-	-	-	-	-	-	x	-	-	-
p1477[3]	BI: Set integrator of n-ctrl.	3	-	-	-	-	-	-	-	x	-	x	-
p1478[3]	CI: Set integrator value n-ctrl.	3	-	-	-	-	-	-	-	x	-	x	-
p1488[3]	Droop input source	3	-	-	-	-	-	-	-	x	-	x	-
p1489[3]	Droop scaling	3	-	-	-	-	-	-	-	x	-	x	-
p1492[3]	Enable droop	3	-	-	-	-	-	-	-	x	-	x	-
p1496[3]	Scaling accel. precontrol	3	-	-	-	-	-	-	-	x	-	x	-
p1499[3]	Scaling accel. torque control	3	-	-	-	-	-	-	-	-	x	-	-
p1500[3]	Selection of torque setpoint	2	-	-	-	-	-	-	-	x	x	x	x
p1501[3]	BI: Change to torque control	3	-	-	-	-	-	-	-	x	x	x	x
p1503[3]	CI: Torque setpoint	3	-	-	-	-	-	-	-	-	x	-	x
p1511[3]	CI: Additional torque setpoint	3	-	-	-	-	-	-	-	x	x	x	x
p1520[3]	CO: Upper torque limit	2	-	-	-	-	-	-	-	x	x	x	x
p1521[3]	CO: Lower torque limit	2	-	-	-	-	-	-	-	x	x	x	x
p1522[3]	CI: Upper torque limit	3	-	-	-	-	-	-	-	x	x	x	x
p1523[3]	CI: Lower torque limit	3	-	-	-	-	-	-	-	x	x	x	x
p1525[3]	Scaling lower torque limit	3	-	-	-	-	-	-	-	x	x	x	x
p1530[3]	Motoring power limitation	2	-	-	-	-	-	-	-	x	x	x	x
p1531[3]	Regenerative power limitation	2	-	-	-	-	-	-	-	x	x	x	x
p1570[3]	CO: Fixed value flux setpoint	2	-	-	-	-	-	-	-	x	x	x	x
p1574[3]	Dynamic voltage headroom	3	-	-	-	-	-	-	-	x	x	x	x
p1580[3]	Efficiency optimization	2	-	-	-	-	-	-	-	x	x	x	x
p1582[3]	Smooth time for flux setpoint	3	-	-	-	-	-	-	-	x	x	x	x
p1596[3]	Int. time field weak. controller	3	-	-	-	-	-	-	-	x	x	x	x
p1610[3]	Continuous torque boost (SLVC)	2	-	-	-	-	-	-	-	x	x	-	-
p1611[3]	Acc. torque boost (SLVC)	2	-	-	-	-	-	-	-	x	x	-	-
p1740	Gain for oscillation damping	3	-	-	-	-	-	-	-	x	x	-	-
p1750[3]	Control word of motor model	3	-	-	-	-	-	-	-	x	x	x	x
p1755[3]	Start-freq. motor model (SLVC)	3	-	-	-	-	-	-	-	x	x	-	-
p1756[3]	Hyst.-freq. motor model (SLVC)	3	-	-	-	-	-	-	-	x	x	-	-
p1758[3]	T(wait) transit to feed-fwd-mode	3	-	-	-	-	-	-	-	x	x	-	-
p1759[3]	T(wait) for n-adaption to settle	3	-	-	-	-	-	-	-	x	x	-	-
p1764[3]	Kp of n-adaption (SLVC)	3	-	-	-	-	-	-	-	x	x	-	-
p1780[3]	Control word of Rs/Rr-adaption	3	-	-	-	-	-	-	-	x	x	-	-
p0400[3]	Select encoder type	2	-	-	-	-	-	-	-	-	-	x	x
p0408[3]	Encoder pulses per revolution	2	-	-	-	-	-	-	-	-	-	x	x
p0491[3]	Reaction on speed signal loss	2	-	-	-	-	-	-	-	-	-	x	x
p0492[3]	Allowed speed difference	2	-	-	-	-	-	-	-	-	-	x	x
p0494[3]	Delay speed loss reaction	2	-	-	-	-	-	-	-	-	-	x	x

1) If the speed control (main setpoint) is selected a torque setpoint is available via the additional setpoint channel.



Caution:

When commissioning Vector Control with encoder-feedback (VC), the drive should be configured for V/f mode (see P1300) first.

Run the drive and compare r0061 with r0021 that should agree in

- sign and
- magnitude (with a deviation of only a few percent).

Only if both criteria are fulfilled, change P1300 and select VC (P1300 = 21 or 23).

P0400 = 1 (single channel encoder) will only allow operation in one direction.

If operation in both directions is required, connect an encoder with 2 channels (A and B) and select setting 2.

For more information, see Operating Instructions, chapter "Interfaces".

P1310[3]	Continuous boost			Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: %	Def: 50.0	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 250.0	

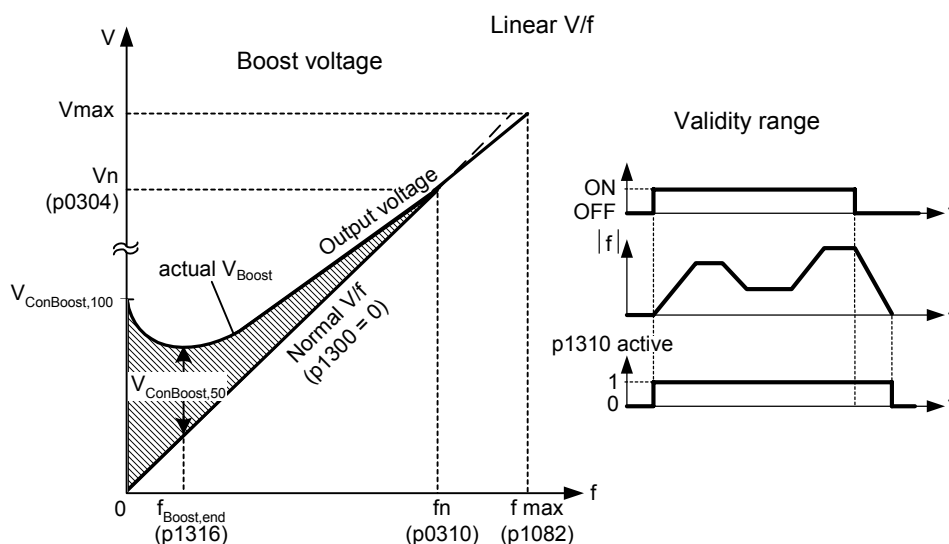
At low output frequencies the output voltage is low to keep the flux level constant.

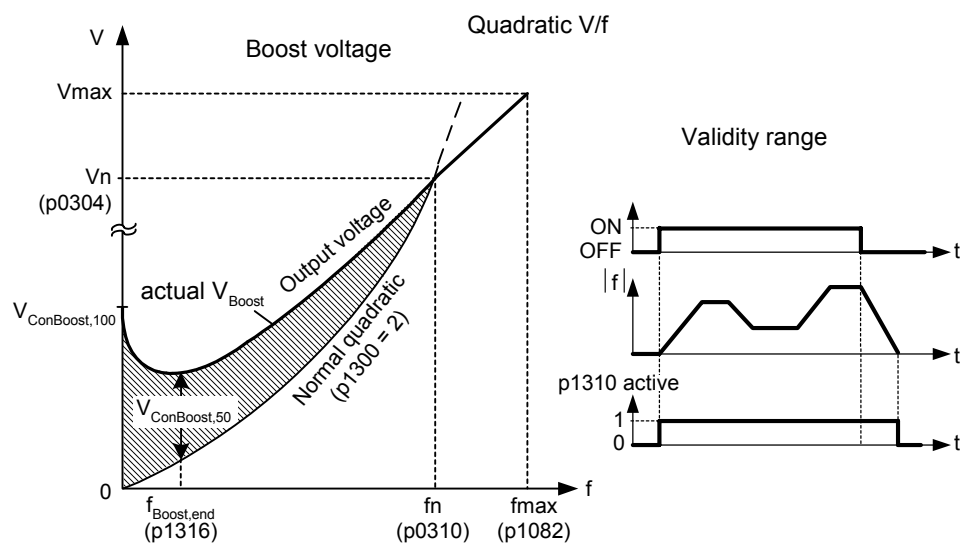
However, the output voltage may be too low

- for magnetisation the asynchronous motor
- to hold the load
- to overcome losses in the system.

The inverter output voltage can be increased via P1310 for the compensation of losses, hold loads at 0 Hz or maintain the magnetization

Defines boost level in [%] relative to P0305 (rated motor current) applicable to both linear and quadratic V/f curves according to the diagram below:





where voltage values are given

$$V_{\text{ConBoost},100} = p0305 \cdot p0350 \cdot \frac{p1310}{100}$$

$$V_{\text{ConBoost},50} = \frac{V_{\text{ConBoost},100}}{2}$$

Index:

P1310[0] : 1st. Drive data set (DDS)
 P1310[1] : 2nd. Drive data set (DDS)
 P1310[2] : 3rd. Drive data set (DDS)

Dependency:

Continuous boost P1310 has no effect during vector operation.

Note:

Increasing the boost levels increases motor heating (especially at standstill).

The boost values are combined when continuous boost (P1310) used in conjunction with other boost parameters (acceleration boost P1311 and starting boost P1312).

However priorities are allocated to these parameters as follows:
 P1310 > P1311 > P1312

The total boost is limited by following equation:

$$\sum V_{\text{Boost}} \leq 3 \cdot R_s \cdot I_{\text{Mot}} = 3 \cdot p0305 \cdot p0350$$

Setting in P0640 (motor overload factor [%]) limits the boost:

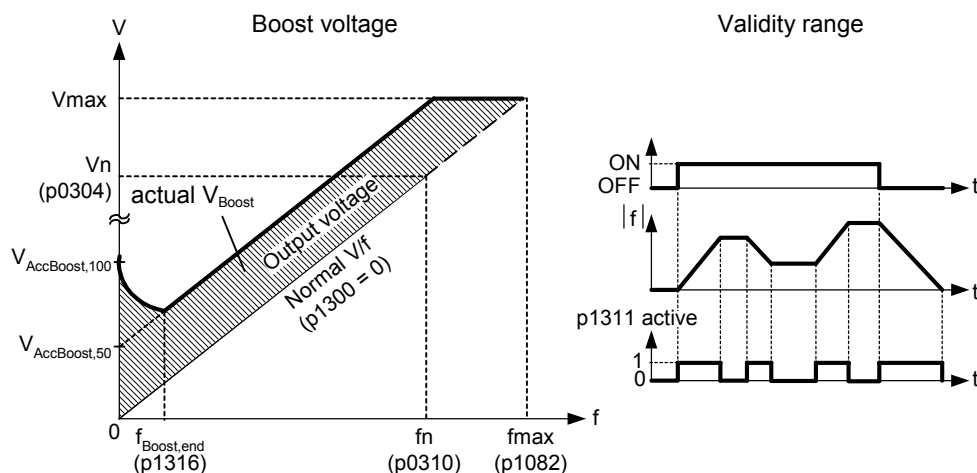
$$\frac{\sum V_{\text{Boost}}}{p0305 \cdot p0350} \leq \frac{P0640}{100}$$

P1311[3]	Acceleration boost	Datatype: Float	Unit: %	Min: 0.0	Level 2
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 0.0	
	P-Group: CONTROL			Max: 250.0	

P1311 will only produce boost during ramping, and is therefore useful for additional torque during acceleration and deceleration.

As opposed to parameter P1312, which is only active on the first acceleration issued after the ON command, parameter P1311 is always effect during an acceleration and deceleration when issued, if the condition below is not violated.

Applies boost in [%] relative to P0305 (rated motor current) following a positive setpoint change and drops back out once the setpoint is reached.



where voltage values are given

$$V_{AccBoost,100} = p0305 \cdot P0350 \cdot \frac{p1311}{100}$$

$$V_{AccBoost,50} = \frac{V_{AccBoost,100}}{2}$$

Index:

- P1311[0] : 1st. Drive data set (DDS)
- P1311[1] : 2nd. Drive data set (DDS)
- P1311[2] : 3rd. Drive data set (DDS)

Dependency:

Acceleration boost P1311 has no effect during vector operation.

Note:

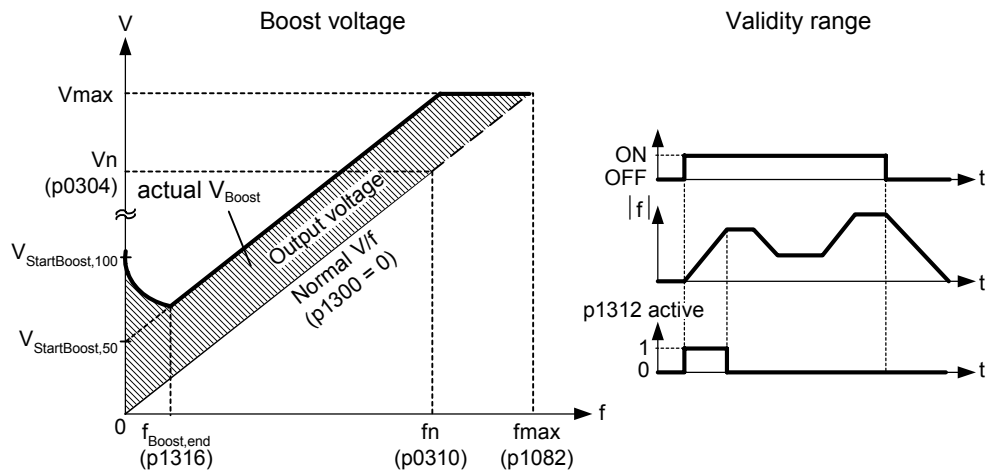
See parameter P1310

P1312[3]	Starting boost	Datatype: Float	Unit: %	Min: 0.0	Level 2
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 0.0	
	P-Group: CONTROL			Max: 250.0	

Applies a constant linear offset (in [%] relative to P0305 (rated motor current)) to active V/f curve (either linear or quadratic) after an ON command and is active until
 1) ramp output reaches setpoint for the first time respectively
 2) setpoint is reduced to less than present ramp output

This is useful for starting loads with high inertia.

Setting the starting boost (P1312) too high will cause the inverter to limit the current, which will in turn restrict the output frequency to below the setpoint frequency.



where voltage values are given

$$V_{StartBoost,100} = p0305 \cdot p0350 \cdot \frac{p1312}{100}$$

$$V_{StartBoost,50} = \frac{V_{StartBoost,100}}{2}$$

Index:

- P1312[0] : 1st. Drive data set (DDS)
- P1312[1] : 2nd. Drive data set (DDS)
- P1312[2] : 3rd. Drive data set (DDS)

Example:

Setpoint = 50Hz. Ramping up with starting boost.
 During ramp up, setpoint changed to 20Hz.
 As soon as setpoint changed, starting boost removed because setpoint smaller than present ramp output.

Dependency:

Starting boost P1312 has no effect during vector operation.

Note:

See parameter P1310

r1315	CO: Total boost voltage	Datatype: Float	Unit: V	Min: -	Level 4
	P-Group: CONTROL			Def: -	
				Max: -	

Displays total value of voltage boost (in volts).

P1316[3]	Boost end frequency	Datatype: Float	Unit: %	Min: 0.0	Level 3
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 20.0	
	P-Group: CONTROL			Max: 100.0	

Defines point at which programmed boost reaches 50 % of its value.

This value is expressed in [%] relative to P0310 (rated motor frequency).

The default frequency is defined as follows:

$$f_{\text{Boost min}} = 2 \cdot \left(\frac{153}{\sqrt{P_{\text{motor}}}} + 3 \right)$$

Index:

- P1316[0] : 1st. Drive data set (DDS)
- P1316[1] : 2nd. Drive data set (DDS)
- P1316[2] : 3rd. Drive data set (DDS)

Note:

The expert user may change this value to alter the shape of the curve, e.g. to increase torque at a particular frequency.

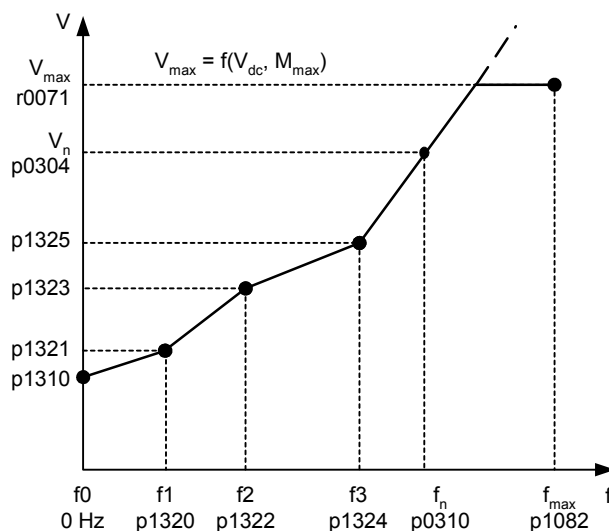
Default value is depending on inverter type and its rating data.

Details:

See diagram in P1310 (continuous boost).

P1320[3]	Programmable V/f freq. coord. 1			Min: 0.00	Level 3
	CStat: CT	Datatype: Float	Unit: Hz	Def: 0.00	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 650.00	

Sets V/f coordinates (P1320/1321 to P1324/1325) to define V/f characteristic.



$$p1310[V] = \frac{p1310[\%]}{100[\%]} \cdot \frac{r0395[\%]}{100[\%]} \cdot p0304[V]$$

$$p1310[V] = \frac{p1310[\%]}{100[\%]} \cdot \frac{r0395[\%]}{100[\%]} \cdot p0304[V]$$

Index:

P1320[0] : 1st. Drive data set (DDS)
P1320[1] : 2nd. Drive data set (DDS)
P1320[2] : 3rd. Drive data set (DDS)

Example:

This parameter can be used to provide correct torque at correct frequency and is useful when used with synchronous motors.

Dependency:

To set parameter, select P1300 = 3 (V/f with programmable characteristic).

Note:

Linear interpolation will be applied between the individual data points.

V/f with programmable characteristic (P1300 = 3) has 3 programmable points.

The two non-programmable points are:

- Continuous boost P1310 at zero 0 Hz
- Rated motor voltage P0304 at rated motor frequency P0310

The acceleration boost and starting boost defined in P1311 and P1312 are applied to V/f with programmable characteristic.

P1321[3]	Programmable V/f volt. coord. 1			Min: 0.0	Level 3
	CStat: CUT	Datatype: Float	Unit: V	Def: 0.0	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 3000.0	

See P1320 (programmable V/f freq. coord. 1).

Index:

P1321[0] : 1st. Drive data set (DDS)
P1321[1] : 2nd. Drive data set (DDS)
P1321[2] : 3rd. Drive data set (DDS)

P1322[3]	Programmable V/f freq. coord. 2	Min: 0.00	Level
CStat: CT	Datatype: Float	Unit: Hz	Def: 0.00
P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 650.00
3			
See P1320 (programmable V/f freq. coord. 1).			
Index:			
P1322[0] : 1st. Drive data set (DDS)			
P1322[1] : 2nd. Drive data set (DDS)			
P1322[2] : 3rd. Drive data set (DDS)			
P1323[3]	Programmable V/f volt. coord. 2	Min: 0.0	Level
CStat: CUT	Datatype: Float	Unit: V	Def: 0.0
P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 3000.0
3			
See P1320 (programmable V/f freq. coord. 1).			
Index:			
P1323[0] : 1st. Drive data set (DDS)			
P1323[1] : 2nd. Drive data set (DDS)			
P1323[2] : 3rd. Drive data set (DDS)			
P1324[3]	Programmable V/f freq. coord. 3	Min: 0.00	Level
CStat: CT	Datatype: Float	Unit: Hz	Def: 0.00
P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 650.00
3			
See P1320 (programmable V/f freq. coord. 1).			
Index:			
P1324[0] : 1st. Drive data set (DDS)			
P1324[1] : 2nd. Drive data set (DDS)			
P1324[2] : 3rd. Drive data set (DDS)			
P1325[3]	Programmable V/f volt. coord. 3	Min: 0.0	Level
CStat: CUT	Datatype: Float	Unit: V	Def: 0.0
P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 3000.0
3			
See P1320 (programmable V/f freq. coord. 1).			
Index:			
P1325[0] : 1st. Drive data set (DDS)			
P1325[1] : 2nd. Drive data set (DDS)			
P1325[2] : 3rd. Drive data set (DDS)			
P1330[3]	Cl: Voltage setpoint	Min: 0:0	Level
CStat: CT	Datatype: U32	Unit: -	Def: 0:0
P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 40000:0
3			
BICO parameter for selecting source of voltage setpoint for independent V/f control.			
Index:			
P1330[0] : 1st. Command data set (CDS)			
P1330[1] : 2nd. Command data set (CDS)			
P1330[2] : 3rd. Command data set (CDS)			
P1333[3]	Start frequency for FCC	Min: 0.0	Level
CStat: CUT	Datatype: Float	Unit: %	Def: 10.0
P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 100.0
3			
Defines start frequency at which FCC (flux current control) is enabled as [%] of rated motor frequency (P0310).			
Index:			
P1333[0] : 1st. Drive data set (DDS)			
P1333[1] : 2nd. Drive data set (DDS)			
P1333[2] : 3rd. Drive data set (DDS)			
Notice:			
If this value is too low, the system may become unstable.			

P1335[3]	Slip compensation	Datatype: Float	Unit: %	Min: 0.0	Level 2
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 0.0	
	P-Group: CONTROL			Max: 600.0	

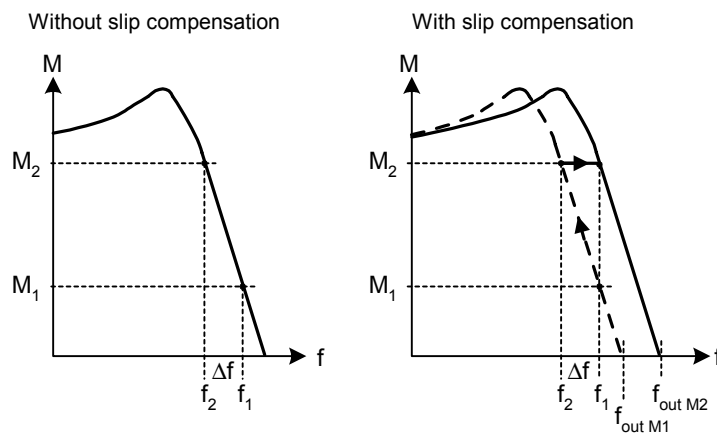
Dynamically adjusts output frequency of inverter so that motor speed is kept constant independent of motor load.

In the V/f-control, the motor speed will always be less than the command speed due to the slip speed. For a given speed command, the speed will drop as load is increased. The speed regulation of drive can be improved by the technique known as slip compensation.

Increasing the load from M1 to M2 (see diagram) will decrease the motor speed from f1 to f2, due to the slip.

The inverter can compensate for this by increasing the output frequency slightly as the load increases. An increase of the output frequency from f_{out M1} to f_{out M2} will result in a motor speed at f1 for load M2.

The inverter measures the current and increases the output frequency to compensate for the expected slip. P1335 can be used to enable and fine-tune the slip compensation.

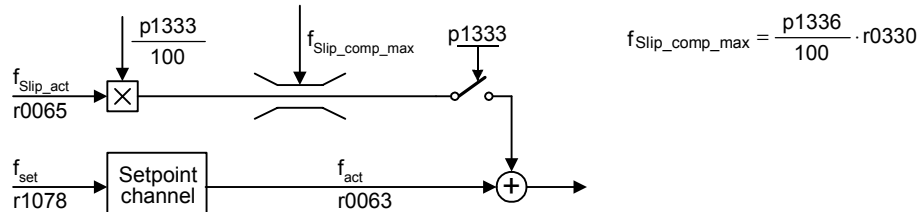


Index:

- P1335[0] : 1st. Drive data set (DDS)
- P1335[1] : 2nd. Drive data set (DDS)
- P1335[2] : 3rd. Drive data set (DDS)

Notice:

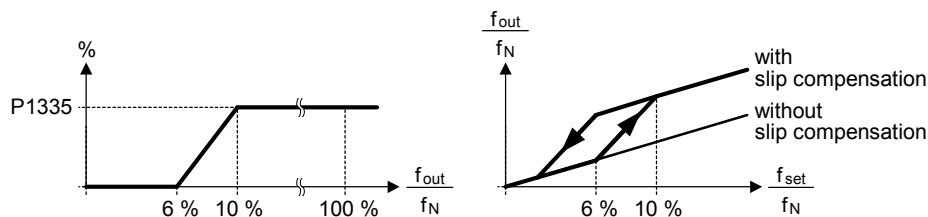
The applied value of the slip compensation (scaled by P1335) is limited by following equation:



Value:

- P1335 = 0 % : Slip compensation disabled.
- P1335 = 50 % - 70 % : Full slip compensation at cold motor (partial load).
- P1335 = 100 % : Full slip compensation at warm motor (full load).

Range of slip compensation :



Note:

Gain adjustment enables fine-tuning of the actual motor speed (see P1460 - gain speed control).

100% = standard setting for warm stator.

P1336[3]	Slip limit			Min: 0	Level 2
	CStat: CUT	Datatype: U16	Unit: %	Def: 250	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 600	

Compensation slip limit in [%] relative to r0330 (rated motor slip), which is added to frequency setpoint.

Index:

- P1336[0] : 1st. Drive data set (DDS)
- P1336[1] : 2nd. Drive data set (DDS)
- P1336[2] : 3rd. Drive data set (DDS)

Dependency:

Slip compensation (P1335) active.

r1337	CO: V/f slip frequency			Min: -	Level 3
	P-Group: CONTROL	Datatype: Float	Unit: %	Def: -	
				Max: -	

Displays actual compensated motor slip as [%]

Dependency:

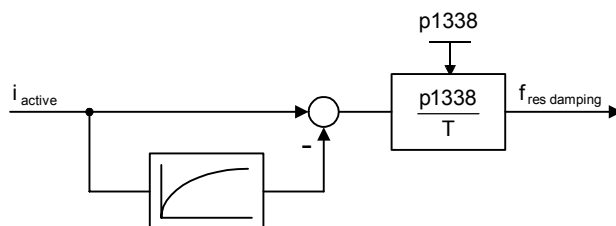
Slip compensation (P1335) active.

P1338[3]	Resonance damping gain V/f			Min: 0.00	Level 3
	CStat: CUT	Datatype: Float	Unit: -	Def: 0.00	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 10.00	

Defines resonance damping gain for V/f.

Here, di/dt of the active current will be scaled by P1338 (see diagram below).

If di/dt increases the resonance damping circuit decreases the inverter output frequency.



Index:

- P1338[0] : 1st. Drive data set (DDS)
- P1338[1] : 2nd. Drive data set (DDS)
- P1338[2] : 3rd. Drive data set (DDS)

Note:

The resonance circuit damps oscillations of the active current which frequently occur during no-load operation.

In V/f modes (see P1300), the resonance damping circuit is active in a range from approx. 6 % to 80 % of rated motor frequency (P0310).

If the value of P1338 is too high, this will cause instability (forward control effect).

P1340[3]	I_{max} controller prop. gain			Min: 0.000	Level 3
	CStat: CUT	Datatype: Float	Unit: -	Def: 0.000	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 0.499	

Proportional gain of the I_{max} controller.

The I_{max} controller reduces inverter current if the output current exceeds the maximum motor current (r0067).

In linear V/f, parabolic V/f, FCC, and programmable V/f modes the I_{max} controller uses both a frequency controller (see parameters P1340 and P1341) and a voltage controller (see parameters P1345 and P1346). The frequency controller seeks to reduce current by limiting the inverter output frequency (to a minimum of the two times nominal slip frequency).

If this action does not successfully remove the overcurrent condition, the inverter output voltage is reduced using the I_{max} voltage controller.

When the overcurrent condition has been removed successfully, frequency limiting is removed using the ramp-up time set in P1120.

In linear V/f for textiles, FCC for textiles, or external V/f modes only the I_{max} voltage controller is used to reduce current (See parameters P1345 and P1346).

Index:

P1340[0] : 1st. Drive data set (DDS)
P1340[1] : 2nd. Drive data set (DDS)
P1340[2] : 3rd. Drive data set (DDS)

Note:

The I_{max} controller can be disabled by setting the frequency controller integral time P1341 to zero. This disables both the frequency and voltage controllers.

Note that when disabled, the I_{max} controller will take no action to reduce current but overcurrent warnings will still be generated, and the Drive will trip in excessive overcurrent or overload conditions.

P1341[3]	I_{max} controller integral time			Min: 0.000	Level 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.300	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 50.000	

Integral time constant of the I_{max} controller.

P1341 = 0 :
I_{max} controller disabled

P1340 = 0 and P1341 > 0 :
frequency controller enhanced integral

P1340 > 0 and P1341 > 0 :
frequency controller normal PI control
See parameter P1340 for further information.

Index:

P1341[0] : 1st. Drive data set (DDS)
P1341[1] : 2nd. Drive data set (DDS)
P1341[2] : 3rd. Drive data set (DDS)

r1343	CO: I_{max} controller freq. output			Min: -	Level 3
		Datatype: Float	Unit: Hz	Def: -	
	P-Group: CONTROL			Max: -	

Displays effective frequency limitation.

Dependency:

If I_{max} controller not in operation, parameter normally shows max. frequency P1082.

r1344	CO: I_{max} controller volt. output			Min: -	Level 3
		Datatype: Float	Unit: V	Def: -	
	P-Group: CONTROL			Max: -	

Displays amount by which the I_{max} controller is reducing the inverter output voltage.

P1345[3]	I_{max} voltage ctrl. prop. gain				Min: 0.000	Level 3
	CStat: CUT	Datatype: Float	Unit: -	Def: 0.250		
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 5.499		

If the output current (r0068) exceeds the maximum current (r0067), the frequency inverter is dynamically controlled by reducing the output voltage. This parameter sets the proportional gain of this controller. See parameter P1340 for further information.

Index:

- P1345[0] : 1st. Drive data set (DDS)
- P1345[1] : 2nd. Drive data set (DDS)
- P1345[2] : 3rd. Drive data set (DDS)

P1346[3]	I_{max} voltage ctrl. integral time				Min: 0.000	Level 3
	CStat: CUT	Datatype: Float	Unit: s	Def: 0.300		
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 50.000		

Integral time constant of the I_{max} voltage controller.

P1341 = 0 :

I_{max} controller disabled

P1345 = 0 and P1346 > 0 :

I_{max} voltage controller enhanced integral

P1345 > 0 and P1346 > 0 :

I_{max} voltage controller normal PI control

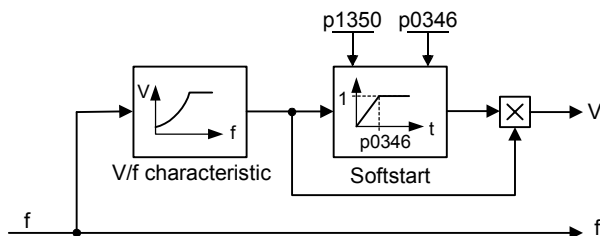
See parameter P1340 for further information.

Index:

- P1346[0] : 1st. Drive data set (DDS)
- P1346[1] : 2nd. Drive data set (DDS)
- P1346[2] : 3rd. Drive data set (DDS)

P1350[3]	Voltage soft start				Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 1		

Sets whether voltage is built up smoothly during magnetization time (ON) or whether it simply jumps to boost voltage (OFF).



Possible Settings:

- 0 OFF
- 1 ON

Index:

- P1350[0] : 1st. Drive data set (DDS)
- P1350[1] : 2nd. Drive data set (DDS)
- P1350[2] : 3rd. Drive data set (DDS)

Note:

The settings for this parameter bring benefits and drawbacks:

P1350 = 0: OFF (jump to boost voltage)

Benefit: flux is built up quickly

Drawback: motor may move

P1350 = 1: ON (smooth voltage build-up)

Benefit: motor less likely to move

Drawback: flux build-up takes longer

P1400[3]	Configuration of speed control			Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 1	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 3	

Configuration for speed control.

Index:

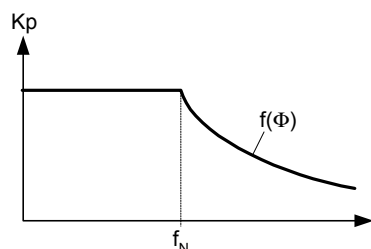
P1400[0] : 1st. Drive data set (DDS)
P1400[1] : 2nd. Drive data set (DDS)
P1400[2] : 3rd. Drive data set (DDS)

Bitfields:

Bit00	Automatic Kp adaption	0	No	1	Yes
Bit01	Integral freeze (SLVC)	0	No	1	Yes

Note:

P1400 Bit 00 = 1:
Automatic gain adaption of speed controller (P1460 resp. P1470) is enabled.
In the area of field weakening the gain is reduced in dependence on flux.



P1400 Bit 01 = 1:
The integrator of the speed controller is frozen if Sensorless Vector Control (SLVC) is selected and the control is switched from closed-loop to open-loop operation.
Advantage:
The correct amount of slip compensation is calculated and applied to the open-loop function for a motor under load.

r1407	CO/BO: Status 2 of motor control			Min: -	Level 3
		Datatype: U16	Unit: -	Def: -	
	P-Group: CONTROL			Max: -	

Displays status of motor control, which can be used to diagnose inverter status.

Bitfields:

Bit00	V/f control enabled	0	No	1	Yes
Bit01	SLVC enabled	0	No	1	Yes
Bit02	Torque control enabled	0	No	1	Yes
Bit05	Stop I-comp. speed control	0	No	1	Yes
Bit06	Set I-comp. speed controller	0	No	1	Yes
Bit08	Upper torque limit active	0	No	1	Yes
Bit09	Lower torque limit active	0	No	1	Yes
Bit10	Droop enabled	0	No	1	Yes
Bit15	DDS change active	0	No	1	Yes

Details:

See P052 (CO/BO: Status word 1)

r1438	CO: Freq. setpoint to controller			Min: -	Level 3
		Datatype: Float	Unit: Hz	Def: -	
	P-Group: CONTROL			Max: -	

Displays setpoint of speed controller.

P1442[3]	Filter time for act. speed	Min: 0	Level
CStat: CUT	Datatype: U16	Unit: ms	Def: 4
P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 32000
			3

Sets time constant of PT1 filter to smooth actual speed of speed controller.

Index:

- P1442[0] : 1st. Drive data set (DDS)
- P1442[1] : 2nd. Drive data set (DDS)
- P1442[2] : 3rd. Drive data set (DDS)

r1445	CO: Act. filtered frequency	Min: -	Level
P-Group: CONTROL	Datatype: Float	Unit: Hz	Def: -
			Max: -
			4

Displays filtered actual speed at speed controller input.

P1452[3]	Filter time for act. speed (SLVC)	Min: 0	Level
CStat: CUT	Datatype: U16	Unit: ms	Def: 4
P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 32000
			3

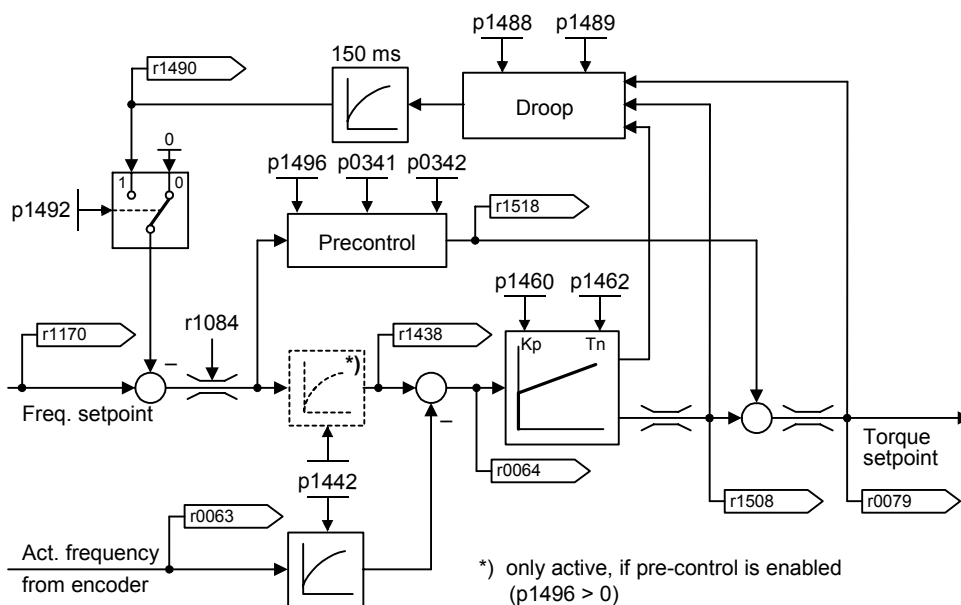
Sets time constant of PT1 filter to filter the speed deviation of speed controller in operation mode SLVC (sensorless vector control).

Index:

- P1452[0] : 1st. Drive data set (DDS)
- P1452[1] : 2nd. Drive data set (DDS)
- P1452[2] : 3rd. Drive data set (DDS)

P1460[3]	Gain speed controller	Min: 0.0	Level
CStat: CUT	Datatype: Float	Unit: -	Def: 3.0
P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 2000.0
			2

Enters gain of speed controller.



Index:

- P1460[0] : 1st. Drive data set (DDS)
- P1460[1] : 2nd. Drive data set (DDS)
- P1460[2] : 3rd. Drive data set (DDS)

P1462[3]	Integral time speed controller	Min: 25	Level 2	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: CONTROL	Active: Immediately		QuickComm.: No

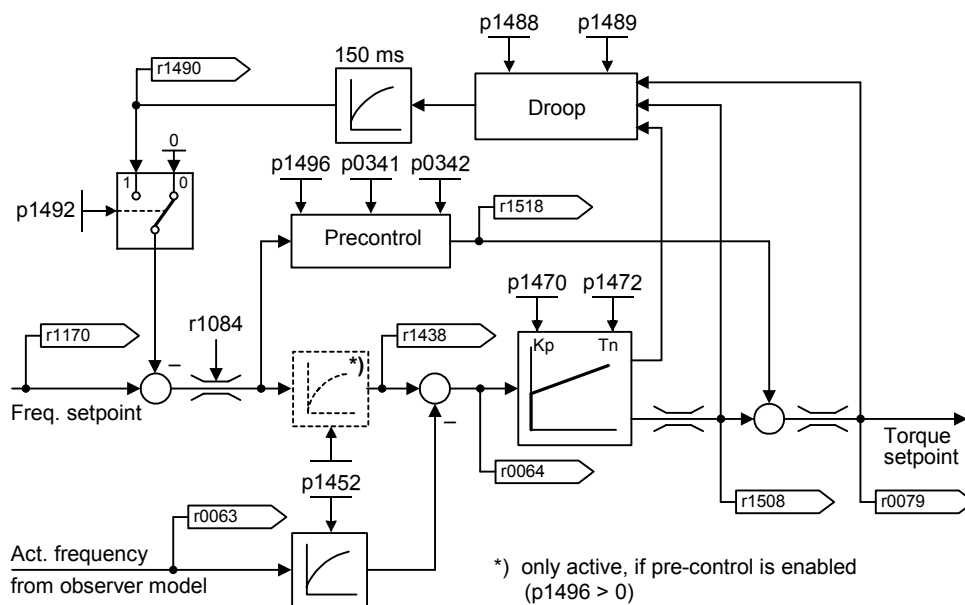
Enters integral time of speed controller.

Index:

- P1462[0] : 1st. Drive data set (DDS)
- P1462[1] : 2nd. Drive data set (DDS)
- P1462[2] : 3rd. Drive data set (DDS)

P1470[3]	Gain speed controller (SLVC)	Min: 0.0	Level 2	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: CONTROL	Active: Immediately		QuickComm.: No

Enters gain of speed controller for sensorless vector control (SLVC).



Index:

- P1470[0] : 1st. Drive data set (DDS)
- P1470[1] : 2nd. Drive data set (DDS)
- P1470[2] : 3rd. Drive data set (DDS)

P1472[3]	Integral time n-ctrl. (SLVC)	Min: 25	Level 2	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: CONTROL	Active: Immediately		QuickComm.: No

Enters integral time of speed controller for sensorless vector control (SLVC).

Index:

- P1472[0] : 1st. Drive data set (DDS)
- P1472[1] : 2nd. Drive data set (DDS)
- P1472[2] : 3rd. Drive data set (DDS)

P1477[3]	BI: Set integrator of n-ctrl.	Min: 0:0	Level 3	
	CStat: CUT	Datatype: U32		Unit: -
	P-Group: CONTROL	Active: first confirm		QuickComm.: No

Selects command source for enabling of integrator setting.

Index:

- P1477[0] : 1st. Command data set (CDS)
- P1477[1] : 2nd. Command data set (CDS)
- P1477[2] : 3rd. Command data set (CDS)

P1478[3]	CI: Set integrator value n-ctrl.				Min: 0:0	Level 3
	CStat: CUT	Datatype: U32	Unit: -	Def: 0:0		
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 40000:0		

Selects source for integral part of speed controller.

Index:

- P1478[0] : 1st. Command data set (CDS)
- P1478[1] : 2nd. Command data set (CDS)
- P1478[2] : 3rd. Command data set (CDS)

Notice:

Neither function works after flying start.

Note:

If the P1482 (integral component of speed controller) is connected and the setting command is not connected (P1477=0), upon pulse enable the integral component of the controller is set once to the last value prior the pulse inhibit.

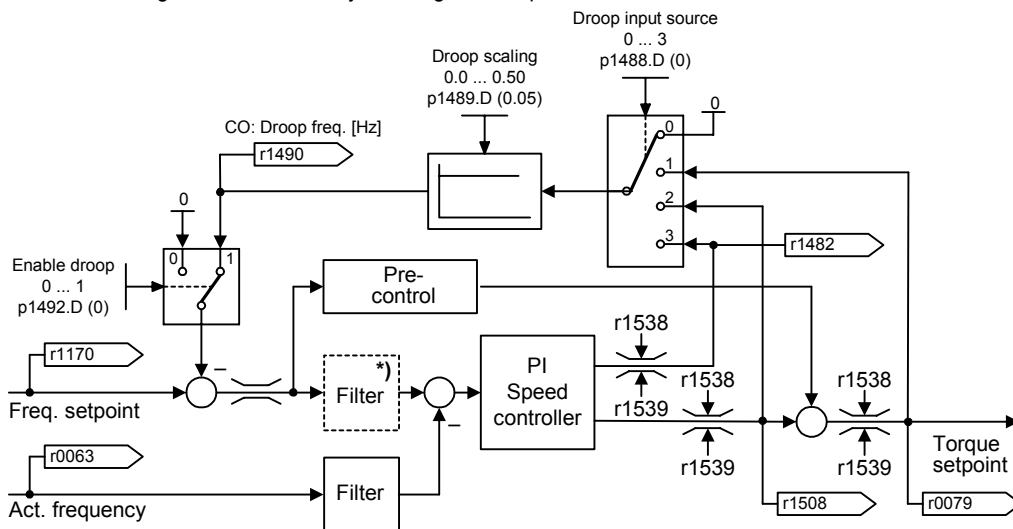
r1482	CO: Integral output of n-ctrl.				Min: -	Level 3
	Datatype: Float	Unit: Nm	Def: -	Max: -		
	P-Group: CONTROL					

Displays integral part of speed controller output.

P1488[3]	Droop input source				Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0		
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 3		

Selects source of droop input signal.

With mechanically coupled motors it is very important that an even load distribution is applied to each motor. The load sharing can be achieved by enabling the droop function on both inverters.



*) only active, if pre-control is enabled (P1496 > 0)

1. Droop is applied as a frequency setpoint to each inverter. The droop increases the slip via the negative feedback of the torque setpoint to the frequency setpoint. In a steady-state an even load distribution can be achieved if the slip characteristics are identical.
 - P1488 > 0
 - P1489 > 0
 - P1492 = 1
2. Droop can act as a setpoint or limitation for a group of inverters (i.e. master-slave inverters). By use of the master-slave inverter technique an even load distribution is achieved across the whole application. This is accomplished by setting the torque setpoint (r1490) on the master inverter which then controls the speed of the master inverter and all connected slave inverters.
 - P1488 > 0
 - P1489 > 0
 - P1492 = 0

Possible Settings:

- 0 Droop input disabled
- 1 Torque setpoint
- 2 Speed controller output
- 3 Speed controller integral output

Index:

- P1488[0] : 1st. Drive data set (DDS)
- P1488[1] : 2nd. Drive data set (DDS)
- P1488[2] : 3rd. Drive data set (DDS)

Dependency:

Droop scaling (P1489) must be > 0 for droop to be effective.

P1489[3]	Droop scaling			Min: 0.00	Level 3
	CStat: CUT	Datatype: Float	Unit: -	Def: 0.05	
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 0.50	

Defines amount of droop in per unit at full load in [%].

Index:

- P1489[0] : 1st. Drive data set (DDS)
- P1489[1] : 2nd. Drive data set (DDS)
- P1489[2] : 3rd. Drive data set (DDS)

Note:

If 0 is entered as value, no droop is applied.

r1490	CO: Droop frequency			Min: -	Level 3
		Datatype: Float	Unit: Hz	Def: -	
	P-Group: CONTROL			Max: -	

Displays output signal of droop function.

This result of droop calculation is subtracted from the speed controller setpoint.

P1492[3]	BI: Enable droop			Min: 0:0	Level 3
	CStat: CUT	Datatype: U32	Unit: -	Def: 0:0	
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 40000:0	

Enables droop.

Index:

- P1492[0] : 1st. Command data set (CDS)
- P1492[1] : 2nd. Command data set (CDS)
- P1492[2] : 3rd. Command data set (CDS)

Dependency:

Effective only if droop scaling P1489 > 0.

P1496[3]	Scaling accel. precontrol	Min: 0.0	Level 3	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: CONTROL	Active: Immediately		QuickComm.: No

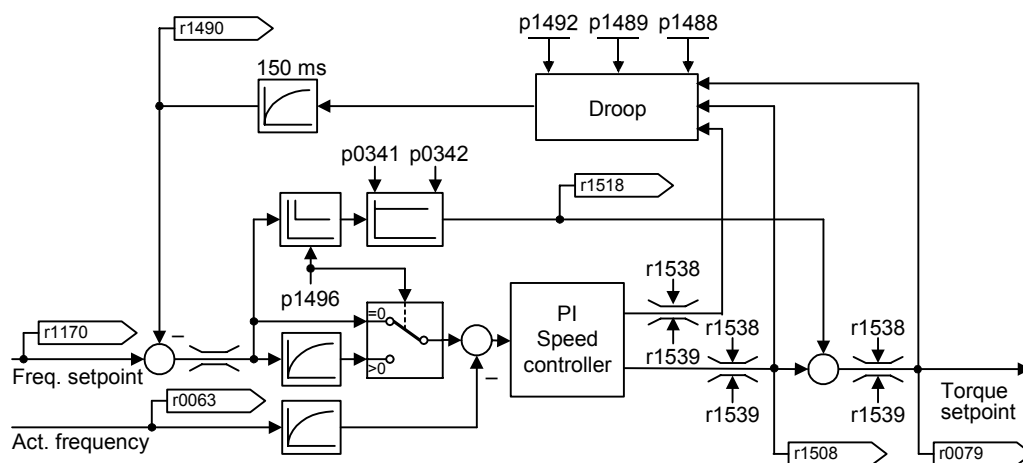
Enters scaling of acceleration in [%].

The response of setpoint changes for the speed control loop can be improved using the precontrol function (P1496).

Precontrol is derived from the differential frequency setpoint multiplied by the mass inertia P0341; P0342 is then supplied as a torque setpoint to the current controller.

If the filter (VC: P1442, SLVC: P1452) is applied in the correct manner, the derived speed controller is only required to control a small deviation in the value of the corrected variable.

Setpoint changes are then passed by the speed controller and are quickly executed.



Index:

- P1496[0] : 1st. Drive data set (DDS)
- P1496[1] : 2nd. Drive data set (DDS)
- P1496[2] : 3rd. Drive data set (DDS)

Note:

- P1496 = 0: Precontrol disabled
- P1496 > 0: Precontrol enabled
- P1496 = 100: Standard setting for precontrol

P1499[3]	Scaling accel. torque control	Min: 0.0	Level 3	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: CONTROL	Active: Immediately		QuickComm.: No

Enters scaling of acceleration in [%] for sensorless torque control (SLVC) at low frequencies.

Index:

- P1499[0] : 1st. Drive data set (DDS)
- P1499[1] : 2nd. Drive data set (DDS)
- P1499[2] : 3rd. Drive data set (DDS)

P1500[3]	Selection of torque setpoint			Min: 0	Level 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: CONTROL	Active: first confirm	QuickComm.: Yes	Max: 66	

Selects torque setpoint source.

In the table of possible settings below, the main setpoint is selected from the least significant digit (i.e., 0 to 6) and any additional setpoint from the most significant digit (i.e., x0 through to x6).

Possible Settings:

0	No main setpoint	
4	USS on RS232	
6	Fieldbus	
40	No main setp.	+ USS on RS232
44	USS on RS232	+ USS on RS232
46	Fieldbus	+ USS on RS232
60	No main setp.	+ Fieldbus
64	USS on RS232	+ Fieldbus
66	Fieldbus	+ Fieldbus

Index:

P1500[0]	: 1st. Command data set (CDS)
P1500[1]	: 2nd. Command data set (CDS)
P1500[2]	: 3rd. Command data set (CDS)

Note:

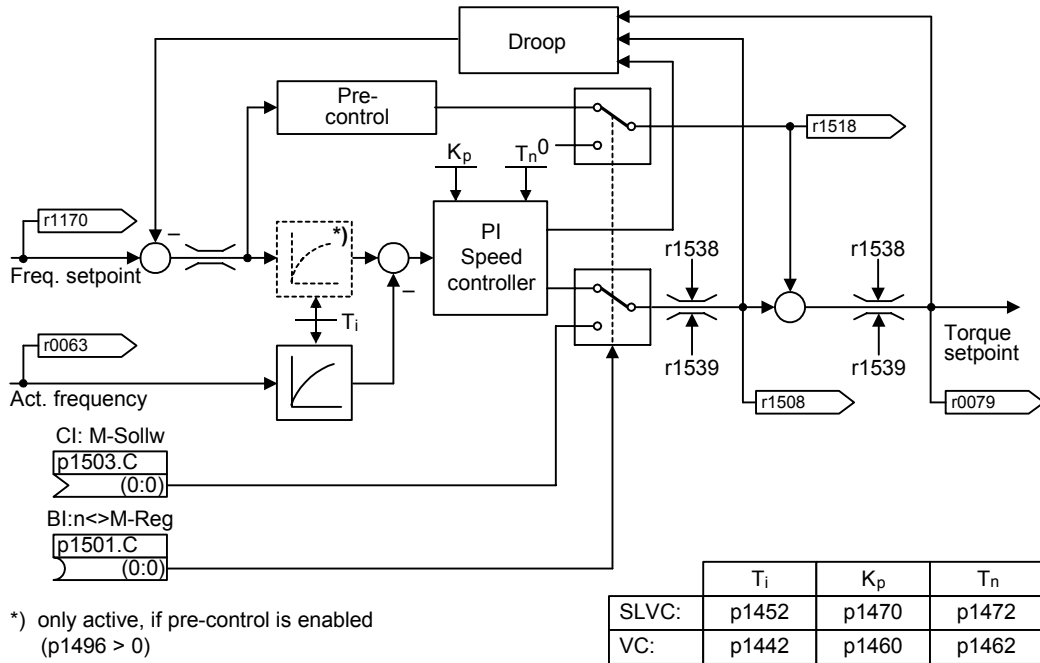
Be aware, by changing of parameter P1500 all BICO parameters (see table below) are modified.

		p1500 = xy			
		y = 0	y = 4	y = 6	
p1500 = xy	x = 0	0.0	2015.1	2050.1	p1503
		0.0	0.0	0.0	p1511
x = 4		0.0	2015.1	2050.1	p1503
		2015.1	2015.1	2015.1	p1511
x = 6		0.0	2015.1	2050.1	p1503
		2050.1	2050.1	2050.1	p1511

Example: p1500 = 46 → p1503 = 2050.1
p1511 = 2015.1

P1501[3]	BI: Change to torque control			Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 0:0	
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 40000:0	

Selects command source from which it is possible to change between master (speed control) and slave (torque control).



*) only active, if pre-control is enabled (p1496 > 0)

Index:

- P1501[0] : 1st. Command data set (CDS)
- P1501[1] : 2nd. Command data set (CDS)
- P1501[2] : 3rd. Command data set (CDS)

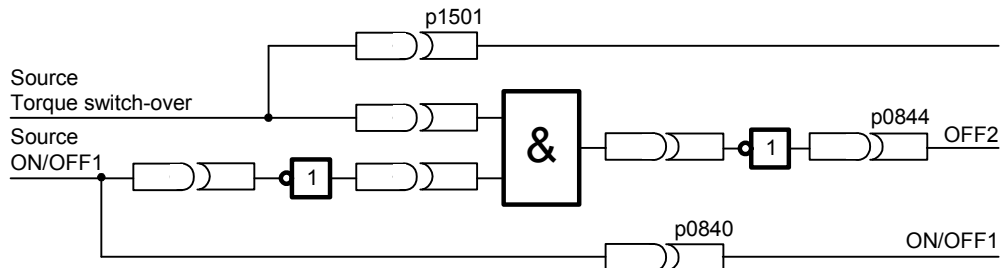
Details:

- Speed control with encoder feedback see P1460
- Speed control without encoder feedback see P1470



Caution:

The OFF1 command is not recognized when torque control is selected indirectly (P1300=20, 21 and P1501=1). However, if direct selection of torque control is used (P1300=22, 23) the OFF1 command is recognized as OFF2. If indirect selection of torque control is used, it is recommended to program an OFF2 command using Profibus or create the following circuit using the Free Function Blocks (FFB):



P1503[3]	CI: Torque setpoint	CStat: CT P-Group: CONTROL	Datatype: U32 Active: first confirm	Unit: - QuickComm.: No	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	Selects source of torque setpoint for torque control.					
	Index: P1503[0] : 1st. Command data set (CDS) P1503[1] : 2nd. Command data set (CDS) P1503[2] : 3rd. Command data set (CDS)					
r1508	CO: Torque setpoint	P-Group: CONTROL	Datatype: Float	Unit: Nm	Min: - Def: - Max: -	Level 2
	Displays torque setpoint before limitation.					
P1511[3]	CI: Additional torque setpoint	CStat: CT P-Group: CONTROL	Datatype: U32 Active: first confirm	Unit: - QuickComm.: No	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	Selects source of additional torque setpoint for torque and speed control.					
	Index: P1511[0] : 1st. Command data set (CDS) P1511[1] : 2nd. Command data set (CDS) P1511[2] : 3rd. Command data set (CDS)					
r1515	CO: Additional torque setpoint	P-Group: CONTROL	Datatype: Float	Unit: Nm	Min: - Def: - Max: -	Level 2
	Displays additional torque setpoint.					
r1518	CO: Acceleration torque	P-Group: CONTROL	Datatype: Float	Unit: Nm	Min: - Def: - Max: -	Level 3
	Displays acceleration torque.					
P1520[3]	CO: Upper torque limit	CStat: CUT P-Group: CONTROL	Datatype: Float Active: Immediately	Unit: Nm QuickComm.: No	Min: -99999.00 Def: 5.13 Max: 99999.00	Level 2
	Specifies fixed value for upper torque limitation.					
	$p1520_{def} = 1.5 \cdot r0333$ $p1520_{max} = \pm 4 \cdot r0333$					
	Index: P1520[0] : 1st. Drive data set (DDS) P1520[1] : 2nd. Drive data set (DDS) P1520[2] : 3rd. Drive data set (DDS)					
P1521[3]	CO: Lower torque limit	CStat: CUT P-Group: CONTROL	Datatype: Float Active: Immediately	Unit: Nm QuickComm.: No	Min: -99999.00 Def: -5.13 Max: 99999.00	Level 2
	Enters fixed value of lower torque limitation.					
	$p1521_{def} = -1.5 \cdot r0333$ $p1521_{max} = \pm 4 \cdot r0333$					
	Index: P1521[0] : 1st. Drive data set (DDS) P1521[1] : 2nd. Drive data set (DDS) P1521[2] : 3rd. Drive data set (DDS)					

P1522[3]	CI: Upper torque limit	Min: 0:0	Level 3	
	CStat: CT	Datatype: U32		Unit: -
	P-Group: CONTROL	Active: first confirm		QuickComm.: No

Selects source of upper torque limitation.

Index:

- P1522[0] : 1st. Command data set (CDS)
- P1522[1] : 2nd. Command data set (CDS)
- P1522[2] : 3rd. Command data set (CDS)

P1523[3]	CI: Lower torque limit	Min: 0:0	Level 3	
	CStat: CT	Datatype: U32		Unit: -
	P-Group: CONTROL	Active: first confirm		QuickComm.: No

Selects source of lower torque limitation.

Index:

- P1523[0] : 1st. Command data set (CDS)
- P1523[1] : 2nd. Command data set (CDS)
- P1523[2] : 3rd. Command data set (CDS)

P1525[3]	Scaling lower torque limit	Min: -400.0	Level 3	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: CONTROL	Active: Immediately		QuickComm.: No

Enters scaling of lower torque limitation in [%].

Index:

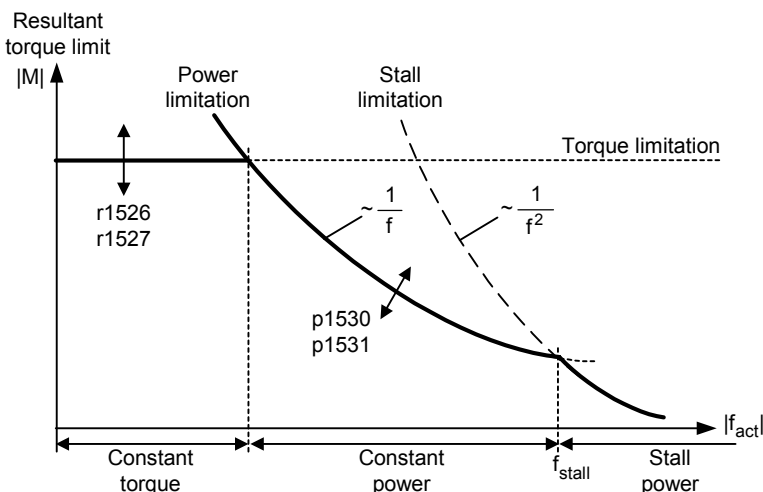
- P1525[0] : 1st. Drive data set (DDS)
- P1525[1] : 2nd. Drive data set (DDS)
- P1525[2] : 3rd. Drive data set (DDS)

Note:

P1525 = 100 % = standard setting

r1526	CO: Upper torque limitation	Min: -	Level 3	
		Datatype: Float		Unit: Nm
	P-Group: CONTROL	Def: -		Max: -

Displays actual upper torque limitation.



Dependency:

The parameters r1526 and r1527 depend on P1520, P1521, P1522, P1523 and P1525.

r1527	CO: Lower torque limitation	Min: -	Level 3	
		Datatype: Float		Unit: Nm
	P-Group: CONTROL	Def: -		Max: -

Displays actual lower torque limitation.

Details:

See parameter r1526.

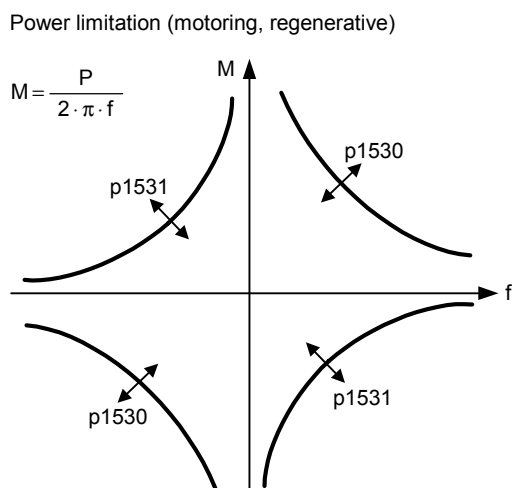
P1530[3]	Motoring power limitation				Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: -	Def: 0.75		
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 8000.0		

Defines fixed value for the max. permissible motoring active power (motoring power limitation).

$$p1530_{def} = 2.5 \cdot P0307$$

$$p1530_{max} = 3 \cdot P0307$$

Parameter P1530 limits the torque in addition to the act. frequency as displayed in the following characteristic.



Index:

- P1530[0] : 1st. Drive data set (DDS)
- P1530[1] : 2nd. Drive data set (DDS)
- P1530[2] : 3rd. Drive data set (DDS)

P1531[3]	Regenerative power limitation				Min: -8000.0	Level 2
	CStat: CUT	Datatype: Float	Unit: -	Def: -0.75		
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 0.0		

Enters fixed value for the max. permissible regenerative active power (regenerative power limitation).

$$p1531_{def} = -2.5 \cdot P0307$$

$$p1531_{min} = -3 \cdot P0307$$

Index:

- P1531[0] : 1st. Drive data set (DDS)
- P1531[1] : 2nd. Drive data set (DDS)
- P1531[2] : 3rd. Drive data set (DDS)

Details:

See parameter P1530.

r1536	CO: Max. trq. motoring current				Min: -	Level 4
		Datatype: Float	Unit: A	Def: -		
	P-Group: CONTROL			Max: -		

Displays maximum torque motoring current component.

r1537	CO: Max trq regenerative current				Min: -	Level 4
		Datatype: Float	Unit: A	Def: -		
	P-Group: CONTROL			Max: -		

Displays maximum torque of the regenerative current component.

r1538	CO: Upper torque limit (total) Datatype: Float Unit: Nm Min: - Def: - Max: - P-Group: CONTROL	Level 2
Displays total upper torque limitation.		
r1539	CO: Lower torque limit (total) Datatype: Float Unit: Nm Min: - Def: - Max: - P-Group: CONTROL	Level 2
Displays total lower torque limitation.		
P1570[3]	CO: Fixed value flux setpoint CStat: CUT Datatype: Float Unit: % Min: 50.0 Def: 100.0 Max: 200.0 P-Group: CONTROL Active: Immediately QuickComm.: No	Level 2
Defines fixed value of flux setpoint in [%] relative to rated motor flux.		
Index:	P1570[0] : 1st. Drive data set (DDS) P1570[1] : 2nd. Drive data set (DDS) P1570[2] : 3rd. Drive data set (DDS)	
Note:	If P1570 > 100%, the flux setpoint rises according to the load from 100 % to the value of P1570 between idling and nominal load.	
P1574[3]	Dynamic voltage headroom CStat: CUT Datatype: U16 Unit: V Min: 0 Def: 10 Max: 150 P-Group: CONTROL Active: Immediately QuickComm.: No	Level 3
Sets dynamic voltage headroom for vector control.		
Index:	P1574[0] : 1st. Drive data set (DDS) P1574[1] : 2nd. Drive data set (DDS) P1574[2] : 3rd. Drive data set (DDS)	
P1580[3]	Efficiency optimization CStat: CUT Datatype: U16 Unit: % Min: 0 Def: 0 Max: 100 P-Group: CONTROL Active: Immediately QuickComm.: No	Level 2
Enters degree of efficiency optimization in [%].		
Index:	P1580[0] : 1st. Drive data set (DDS) P1580[1] : 2nd. Drive data set (DDS) P1580[2] : 3rd. Drive data set (DDS)	
Note:	If P1580 > 0, the dynamics for speed control (P1470, P1472) are restricted to prevent vibration. When no load is applied, a value of 100 % produces full flux reduction (i.e. to 50 % of rated motor flux). When using optimization, it is necessary to increase the smoothing time of the flux setpoint (P1582).	
P1582[3]	Smooth time for flux setpoint CStat: CUT Datatype: U16 Unit: ms Min: 4 Def: 15 Max: 500 P-Group: CONTROL Active: Immediately QuickComm.: No	Level 3
Sets time constant of PT1 filter to smooth flux setpoint.		
Index:	P1582[0] : 1st. Drive data set (DDS) P1582[1] : 2nd. Drive data set (DDS) P1582[2] : 3rd. Drive data set (DDS)	
r1583	CO: Flux setpoint (smoothed) Datatype: Float Unit: % Min: - Def: - Max: - P-Group: CONTROL	Level 4
Displays smoothed flux setpoint in [%] relative to rated motor flux.		

P1596[3]	Int. time field weak. controller	Min: 20	Level
CStat: CUT	Datatype: U16	Def: 50	3
P-Group: CONTROL	Active: Immediately	QuickComm.: No	

Sets integral time for field weakening controller.

Index:

P1596[0] : 1st. Drive data set (DDS)
P1596[1] : 2nd. Drive data set (DDS)
P1596[2] : 3rd. Drive data set (DDS)

r1597	CO: Outp. field weak. controller	Min: -	Level
	Datatype: Float	Unit: %	4
P-Group: CONTROL		Def: -	

Displays output signal of field weakening controller in [%] relative to rated motor flux.

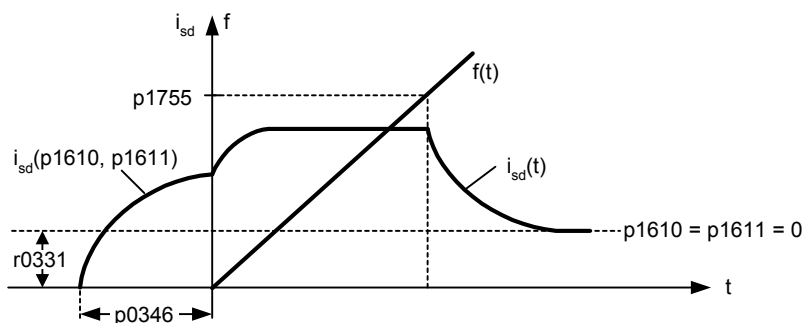
r1598	CO: Flux setpoint (total)	Min: -	Level
	Datatype: Float	Unit: %	3
P-Group: CONTROL		Def: -	

Displays total flux setpoint in [%] relative to the rated motor flux.

P1610[3]	Continuous torque boost (SLVC)	Min: 0.0	Level
CStat: CUT	Datatype: Float	Unit: %	2
P-Group: CONTROL	Active: Immediately	QuickComm.: No	
		Max: 200.0	

Sets continuous torque boost in lower speed range of SLVC (sensorless vector control).

Value is entered in [%] relative to rated motor torque r0333.

**Index:**

P1610[0] : 1st. Drive data set (DDS)
P1610[1] : 2nd. Drive data set (DDS)
P1610[2] : 3rd. Drive data set (DDS)

Note:

P1610 = 100 % corresponds to rated motor torque.

P1611[3]	Acc. torque boost (SLVC)	Min: 0.0	Level
CStat: CUT	Datatype: Float	Unit: %	2
P-Group: CONTROL	Active: Immediately	QuickComm.: No	
		Max: 200.0	

Sets acceleration torque boost in lower speed range of SLVC (sensorless vector control).

Value is entered in [%] relative to rated motor torque r0333.

Index:

P1611[0] : 1st. Drive data set (DDS)
P1611[1] : 2nd. Drive data set (DDS)
P1611[2] : 3rd. Drive data set (DDS)

Note:

P1611 = 100 % corresponds to rated motor torque.

P1654[3]	Smooth time for Isq setpoint	CStat: CUT P-Group: CONTROL	Datatype: Float Active: Immediately	Unit: ms QuickComm.: No	Min: 2.0 Def: 6.0 Max: 20.0	Level 4
	Sets time constant of PT1 filter to filter setpoint of torque generating current component in field weakening range.					
	Index: P1654[0] : 1st. Drive data set (DDS) P1654[1] : 2nd. Drive data set (DDS) P1654[2] : 3rd. Drive data set (DDS)					
P1715[3]	Gain current controller	CStat: CUT P-Group: CONTROL	Datatype: Float Active: Immediately	Unit: - QuickComm.: No	Min: 0.00 Def: 0.25 Max: 5.00	Level 4
	Enters gain of current controller.					
	Index: P1715[0] : 1st. Drive data set (DDS) P1715[1] : 2nd. Drive data set (DDS) P1715[2] : 3rd. Drive data set (DDS)					
P1717[3]	Integral time current controller	CStat: CUT P-Group: CONTROL	Datatype: Float Active: Immediately	Unit: ms QuickComm.: No	Min: 1.0 Def: 4.1 Max: 50.0	Level 4
	Enters integral time of current controller.					
	Index: P1717[0] : 1st. Drive data set (DDS) P1717[1] : 2nd. Drive data set (DDS) P1717[2] : 3rd. Drive data set (DDS)					
r1718	CO: Output of Isq controller	P-Group: CONTROL	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 4
	Displays actual output of Isq current (torque current) controller (PI controller). It contains the proportional and integral part of the PI controller.					
r1719	CO: Integral output of Isq ctrl.	P-Group: CONTROL	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 4
	Displays integral output of Isq current (torque current) controller (PI controller).					
r1723	CO: Output of Isd controller	P-Group: CONTROL	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 4
	Displays actual output of Isd current (flux current) controller (PI controller). It contains the proportional and integral part of the PI controller.					
r1724	CO: Integral output of Isd ctrl.	P-Group: CONTROL	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 4
	Displays integral output of Isd current (flux current) controller (PI controller).					
r1725	CO: Integral limit of Isd ctrl.	P-Group: CONTROL	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 4
	Displays limit of integral output voltage setpoint of Isd current controller.					
r1728	CO: Decoupling voltage	P-Group: CONTROL	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 4
	Displays actual output voltage setpoint of cross channel decoupling.					
P1740	Gain for oscillation damping	CStat: CUT P-Group: CONTROL	Datatype: Float Active: Immediately	Unit: - QuickComm.: No	Min: 0.000 Def: 0.000 Max: 10.000	Level 3
	Sets oscillation damping gain for sensorless vector control at low frequencies.					

P1745[3]	Flux variance limit in stall				Level
	CStat: CUT	Datatype: Float	Unit: %	Min: 0.0	3
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Def: 5.0	
			Max: 1000.0		

Sets the flux variance limit.

With SLVC the variance between the flux setpoint and the actual flux is used to detect motor stall conditions.

Index:

P1745[0] : 1st. Drive data set (DDS)

P1745[1] : 2nd. Drive data set (DDS)

P1745[2] : 3rd. Drive data set (DDS)

Note:

The function is active, with SLVC (P1300 = 20 or 22) and control in open loop mode (output frequency > P1755).

r1746	CO: Actual flux variance				Level
		Datatype: Float	Unit: %	Min: -	3
	P-Group: CONTROL			Def: -	
			Max: -		

Displays the present percentage of flux variance. See P1745.

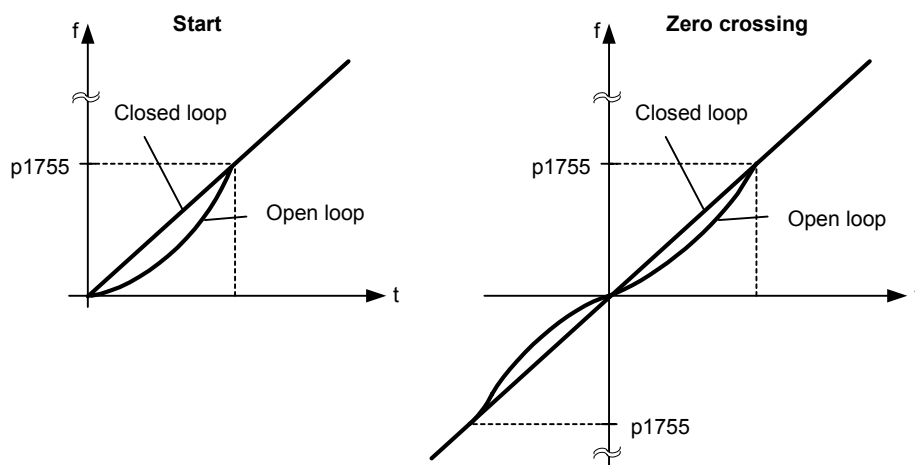
P1750[3]	Control word of motor model				Level
	CStat: CUT	Datatype: U16	Unit: -	Min: 0	3
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Def: 1	
			Max: 3		

Control word of motor model.

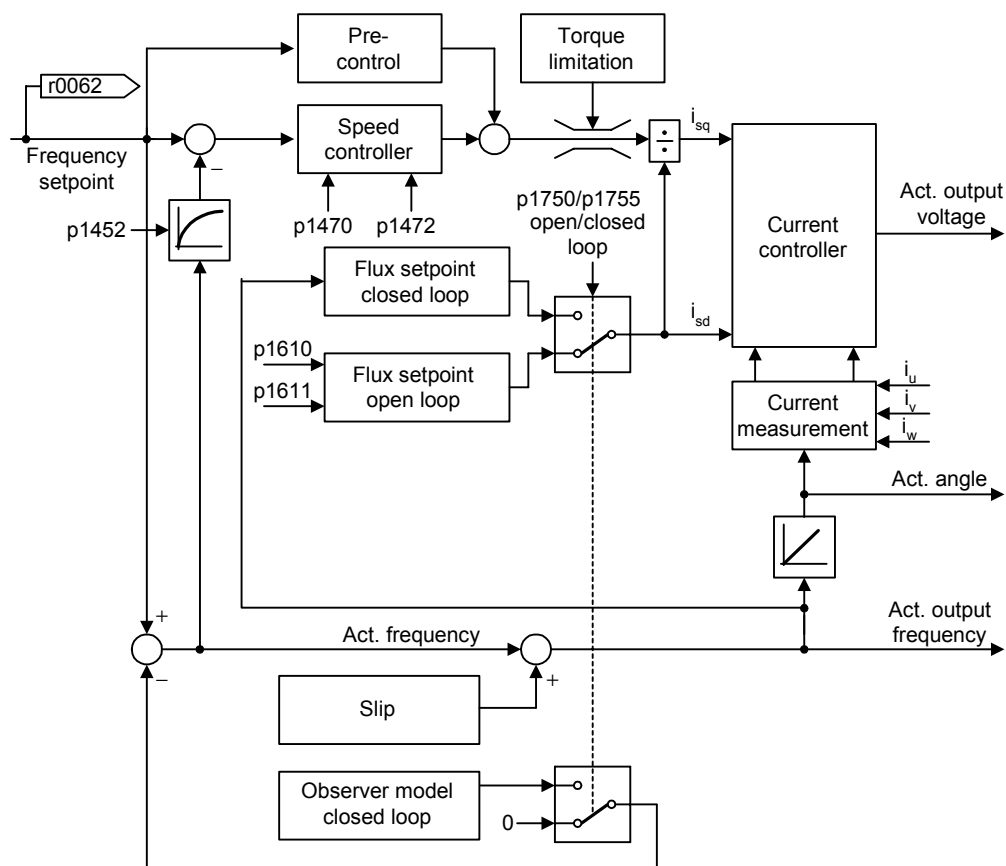
This parameter controls the operation of the sensorless vector control (SLVC) at very low frequencies.

This therefore includes the following conditions:

- Operation directly after an ON command
- zero crossing.



SLVC open loop means that the speed controller does not get any speed feedback from the observer model.



Index:

- P1750[0] : 1st. Drive data set (DDS)
- P1750[1] : 2nd. Drive data set (DDS)
- P1750[2] : 3rd. Drive data set (DDS)

Bitfields:

Bit00	Start SLVC open loop	0	No	1	Yes
Bit01	Zero crossing SLVC open loop	0	No	1	Yes

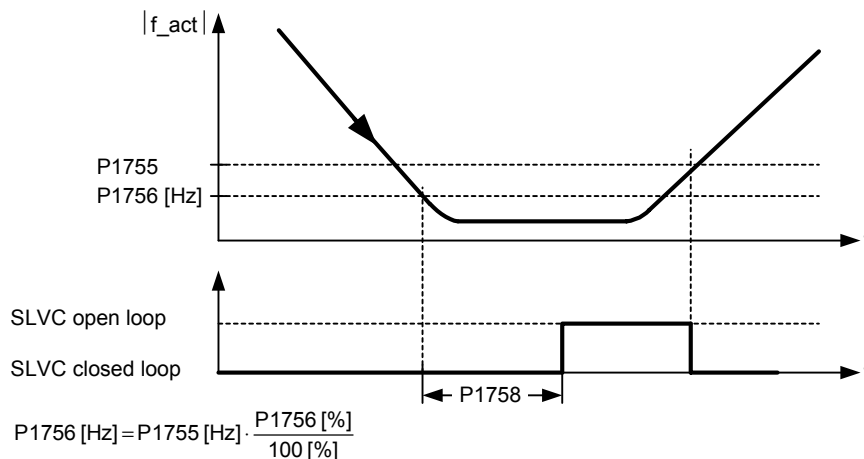
r1751	Status word of motor model	Datatype: U16	Unit: -	Min: -	Def: -	Max: -	Level 3
	P-Group: CONTROL						
	Displays status of transition from feed-forward to observer-control and vice versa.						

Bitfields:

Bit00	Transit to SLVC open loop	0	Yes	1	No
Bit01	N-adaption enabled	0	No	1	Yes
Bit02	Transit to SLVC closed loop	0	No	1	Yes
Bit03	Speed controller enabled	0	No	1	Yes
Bit04	Current injection	0	No	1	Yes
Bit05	Start flux decrease	0	No	1	Yes
Bit14	Rs adapted	0	No	1	Yes
Bit15	Xh adapted	0	No	1	Yes

P1755[3]	Start-freq. motor model (SLVC)				Min: 0.1	Level 3
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 5.0		
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 250.0		

Enters start frequency of sensorless vector control (SLVC).



Index:

- P1755[0] : 1st. Drive data set (DDS)
- P1755[1] : 2nd. Drive data set (DDS)
- P1755[2] : 3rd. Drive data set (DDS)

P1756[3]	Hyst.-freq. motor model (SLVC)				Min: 10.0	Level 3
	CStat: CUT	Datatype: Float	Unit: %	Def: 50.0		
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 100.0		

Enters hysteresis frequency (in percent of start-frequency) to switch back from sensorless-vector-control (SLVC) to current model.

Value is entered in the range 0 % to 50 % relative to P1755 (SLVC stop frequency).

Index:

- P1756[0] : 1st. Drive data set (DDS)
- P1756[1] : 2nd. Drive data set (DDS)
- P1756[2] : 3rd. Drive data set (DDS)

P1758[3]	T(wait) transit to feed-fwd-mode				Min: 100	Level 3
	CStat: CUT	Datatype: U16	Unit: ms	Def: 1500		
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 2000		

Sets waiting time for change from observer-mode to feed-forward-mode

Index:

- P1758[0] : 1st. Drive data set (DDS)
- P1758[1] : 2nd. Drive data set (DDS)
- P1758[2] : 3rd. Drive data set (DDS)

P1759[3]	T(wait) for n-adaption to settle				Min: 50	Level 3
	CStat: CUT	Datatype: U16	Unit: ms	Def: 100		
	P-Group: CONTROL	Active: Immediately	QuickComm.: No	Max: 2000		

Sets waiting time while transition is done from open-loop to close-loop operation

Index:

- P1759[0] : 1st. Drive data set (DDS)
- P1759[1] : 2nd. Drive data set (DDS)
- P1759[2] : 3rd. Drive data set (DDS)

P1764[3]	Kp of n-adaption (SLVC)	CStat: CUT P-Group: CONTROL	Datatype: Float Active: Immediately	Unit: - QuickComm.: No	Min: 0.0 Def: 0.2 Max: 2.5	Level 3
Enters gain of speed adaption controller for sensorless vector control.						
Index:						
P1764[0] : 1st. Drive data set (DDS)						
P1764[1] : 2nd. Drive data set (DDS)						
P1764[2] : 3rd. Drive data set (DDS)						
P1767[3]	Tn of n-adaption (SLVC)	CStat: CUT P-Group: CONTROL	Datatype: Float Active: Immediately	Unit: ms QuickComm.: No	Min: 1.0 Def: 4.0 Max: 200.0	Level 4
Enters speed adaption controller integral time.						
Index:						
P1767[0] : 1st. Drive data set (DDS)						
P1767[1] : 2nd. Drive data set (DDS)						
P1767[2] : 3rd. Drive data set (DDS)						
r1770	CO: Prop. output of n-adaption	P-Group: CONTROL	Datatype: Float	Unit: Hz	Min: - Def: - Max: -	Level 3
Displays proportional part of speed adaption controller.						
r1771	CO: Int. output of n-adaption	P-Group: CONTROL	Datatype: Float	Unit: Hz	Min: - Def: - Max: -	Level 3
Displays integral part of speed adaption controller.						
r1778	CO: Flux angle difference	P-Group: CONTROL	Datatype: Float	Unit: °	Min: - Def: - Max: -	Level 4
Displays flux angle difference between motor model and current transformation before motor model is active.						
P1780[3]	Control word of Rs/Rr-adaption	CStat: CUT P-Group: CONTROL	Datatype: U16 Active: first confirm	Unit: - QuickComm.: No	Min: 0 Def: 3 Max: 3	Level 3
Enables thermal adaptation of stator and rotor resistance to reduce torque errors in speed/torque regulation with speed sensor, or speed errors in speed/torque regulation without speed sensor.						
Index:						
P1780[0] : 1st. Drive data set (DDS)						
P1780[1] : 2nd. Drive data set (DDS)						
P1780[2] : 3rd. Drive data set (DDS)						
Bitfields:						
Bit00 Enable thermal Rs/Rr-adapt. 0 No 1 Yes						
Bit01 Enable observer Rs/Xm-adapt. 0 No 1 Yes						
Note:						
Only stator resistance adaptation is carried out for synchronous motors.						
P1781[3]	Tn of Rs-adaption	CStat: CUT P-Group: CONTROL	Datatype: U16 Active: Immediately	Unit: ms QuickComm.: No	Min: 10 Def: 100 Max: 2000	Level 4
Enters Rs-adaption controller integral time.						
Index:						
P1781[0] : 1st. Drive data set (DDS)						
P1781[1] : 2nd. Drive data set (DDS)						
P1781[2] : 3rd. Drive data set (DDS)						

r1782	Output of Rs-adaptation	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays stator resistance adaptation from controller in [%] relative to rated motor resistance.

Note:

The rated motor resistance is given by the formula:

Rated motor impedance:

$$Z_N = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

P1786[3]	Tn of Xm-adaption	Datatype: U16	Unit: ms	Min: 10	Level 4
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 100	
	P-Group: CONTROL			Max: 2000	

Enters Xm-adaptation controller integral time.

Index:

P1786[0] : 1st. Drive data set (DDS)
P1786[1] : 2nd. Drive data set (DDS)
P1786[2] : 3rd. Drive data set (DDS)

r1787	Output of Xm-adaption	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: CONTROL			Def: - Max: -	

Displays main reactance adaptation from controller in [%] relative to rated impedance.

Note:

The rated motor resistance is given by the formula:

Rated motor impedance:

$$Z_N = \frac{V_N}{\sqrt{3} \cdot I_N} = \frac{p0304}{\sqrt{3} \cdot p0305} \Leftrightarrow 100 \%$$

P1800	Pulse frequency	Datatype: U16	Unit: KHz	Min: 2	Level 2
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 8	
	P-Group: INVERTER			Max: 16	

Sets pulse frequency of power switches in inverter.
The frequency can be changed in steps of 2 kHz.

Dependency:

Minimum pulse frequency depends on P1082 (maximum frequency) and P0310 (rated motor frequency).

The maximal frequency P1082 is limited to pulse frequency P1800 (see P1082).

Note:

If the pulse frequency is increased, max. inverter current r0067 can be reduced (derating).
The derating characteristic depends on the type and power of the inverter (see manual OPERATING INSTRUCTION).

If silent operation is not absolutely necessary, lower pulse frequencies may be selected to reduce inverter losses and radio-frequency emissions.

Under certain circumstances, the inverter may reduce the switching frequency to provide protection against overtemperature (see P0290 and P0291 Bit00).

r1801	CO: Act. pulse frequency	Datatype: U16	Unit: KHz	Min: - Def: - Max: -	Level 3
	P-Group: INVERTER				
	Actual pulse frequency of power switches in inverter.				
	Notice: Under certain conditions (inverter overtemperature, see P0290), this can differ from the values selected in P1800 (pulse frequency).				
P1802	Modulator mode	Datatype: U16	Unit: -	Min: 1 Def: 3 Max: 3	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: INVERTER				
	Selects inverter modulator mode.				
	Possible Settings:				
	1 Asymmetric SVM				
	2 Space vector modulation				
	3 SVM/ASVM controlled mode				
	Notice: Asymmetric space vector modulation (ASVM) produces lower switching losses than space vector modulation (SVM), but may cause irregular rotation at very low speeds. Space vector modulation (SVM) with over-modulation may produce current waveform distortion at high output voltages. Space vector modulation (SVM) without over-modulation will reduce maximum output voltage available to motor.				
P1803[3]	Max. modulation	Datatype: Float	Unit: %	Min: 20.0 Def: 106.0 Max: 150.0	Level 3
	CStat: CUT	Active: Immediately	QuickComm.: No		
	P-Group: INVERTER				
	Sets maximum modulation index.				
	Index: P1803[0] : 1st. Drive data set (DDS) P1803[1] : 2nd. Drive data set (DDS) P1803[2] : 3rd. Drive data set (DDS)				
	Note: P1803 = 100 % : Limit for over-control (for ideal inverter without switching delay). For vector control the modulation limit will be reduced automatically with 4 %.				
P1820[3]	Reverse output phase sequence	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 1	Level 2
	CStat: CT	Active: first confirm	QuickComm.: No		
	P-Group: INVERTER				
	Changes direction of motor rotation without changing setpoint polarity.				
	Possible Settings:				
	0 Forward				
	1 Reverse the Motor				
	Index: P1820[0] : 1st. Drive data set (DDS) P1820[1] : 2nd. Drive data set (DDS) P1820[2] : 3rd. Drive data set (DDS)				
	Dependency: If positive and negative revolution is enabled, frequency setpoint is directly used. If both positive and negative revolution are disabled, reference value is set to zero.				
	Details: See P1000 (select frequency setpoint)				
P1825	On-state voltage of IGBT	Datatype: Float	Unit: V	Min: 0.0 Def: 1.4 Max: 20.0	Level 4
	CStat: CUT	Active: Immediately	QuickComm.: No		
	P-Group: INVERTER				
	Corrects on-state voltage of the IGBTs.				
P1828	Gating unit dead time	Datatype: Float	Unit: us	Min: 0.00 Def: 0.50 Max: 3.50	Level 4
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: INVERTER				
	Sets compensation time of gating unit interlock.				

P1909[3]	Ctrl. word of motor data ident.	Min: 0	Level
CStat: CUT	Datatype: U16	Def: 1	4
P-Group: CONTROL	Active: first confirm	QuickComm.: No	
		Max: 1	

Control word of motor data identification.

Index:

P1909[0] : 1st. Drive data set (DDS)
P1909[1] : 2nd. Drive data set (DDS)
P1909[2] : 3rd. Drive data set (DDS)

Bitfields:

Bit00 Estimation of Xs 0 No 1 Yes

P1910	Select motor data identification	Min: 0	Level
CStat: CT	Datatype: U16	Def: 0	2
P-Group: MOTOR	Active: first confirm	QuickComm.: Yes	
		Max: 20	

Performs a motor data identification.
Performs stator resistance measuring..

Possible Settings:

0 Disabled
1 All param. with param. change
2 All param. without param. change
3 Satur. curve with param. change
4 Satur. curve without par. change
5 XsigDyn id. without par. change
6 Tdead ident. without par. change
7 Rs ident. without par. change
8 Xs ident. without par. change
9 Tr ident. without par. change
10 Xsig ident. without par. change
20 Set voltage vector

Notice:

When choosing the setting for measurement, observe the following:

- "with parameter change"
means that the values are actually adopted as Pxxxx parameter settings (see common settings above) and applied to the controller as well as being shown in the read-only parameters below.
- "without parameter change"
means that the values are only displayed, i.e. shown for checking purposes in the read-only parameters r1912 (identified stator resistance), r1913 (identified rotor time constant), r1914 (ident. total leakage reactance), r1915/r1916/r1917/r1918/r1919 (identified nominal stator reactance/identified stator reactance 1 to 4), r1925 (IGBT on-state voltage) and r1926 (identified gating unit dead time).
The values are not applied to the controller.

When choosing the setting for measurement, observe the following:

Dependency:

P1910 = 2 : Values already calculated are not overwritten.

Note:

Before selecting motor data identification, "Quick commissioning" has to be performed in advance.

Once enabled (P1910 = 1), A0541 generates a warning that the next ON command will initiate measurement of motor parameters.

When transferring parameter p1910, ET 200S FC uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations.

This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):

- Parameter fault 30
- Drive fault 70
- Drive fault 75

When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.

The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

**Caution:**

Motor identification should normally be performed on a cold motor. However, the identification of the motor data should only be performed if the motor temperature is within 5°C of the measured ambient temperature stored in P0625. If the motor identification is not within the 5°C limit then the correct functioning of Vector Control (VC, SLVC) cannot be guaranteed.

The motor rating plate information with respect to the connection of the motor windings (Star or delta connection) must be correct in order to establish the correct equivalent circuit data. The motor identification calculates this data based on a Phase of a Star equivalent circuit P0350 - P0360, irrespective of whether the motor is connected star or delta. This must be considered when the motor data is input directly.

P1911	No. of phase to be identified	Min: 1	Level 2	
	CStat: CT	Datatype: U16		Unit: -
	P-Group: INVERTER	Active: Immediately		QuickComm.: No

Selects maximum number of motor phases to be identified.

r1912[3]	Identified stator resistance	Min: -	Level 2	
		Datatype: Float		Unit: Ohm
	P-Group: MOTOR	Def: -		Max: -

Displays measured stator resistance value (line-to-line) in [Ohms]

Index:

P1912[0] : U_phase
P1912[1] : V_phase
P1912[2] : W_phase

Note:

This value is measured using P1910 = 1 or 2, i.e., identification of all parameters with/without change.

r1913[3]	Identified rotor time constant	Min: -	Level 2	
		Datatype: Float		Unit: ms
	P-Group: MOTOR	Def: -		Max: -

Displays identified rotor time constant.

Index:

P1913[0] : U_phase
P1913[1] : V_phase
P1913[2] : W_phase

r1914[3]	Ident. total leakage inductance	Min: -	Level 2	
		Datatype: Float		Unit: -
	P-Group: MOTOR	Def: -		Max: -

Displays identified total leakage inductance.

Index:

P1914[0] : U_phase
P1914[1] : V_phase
P1914[2] : W_phase

r1915[3]	Ident. nom. stator inductance	Min: -	Level 2	
		Datatype: Float		Unit: -
	P-Group: MOTOR	Def: -		Max: -

Displays identified stator inductance.

Index:

P1915[0] : U_phase
P1915[1] : V_phase
P1915[2] : W_phase

Notice:

If the value identified (Ls = stator inductance) does not lie within the range 50 % < Xs [p. u.] < 500 % fault message 41 (motor data identification failure) is issued.

P0949 provides further information (fault value = 4 in this case).

r1916[3]	Identified stator inductance 1	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level 2
	P-Group: MOTOR				
	Displays identified stator inductance.				
Index:	P1916[0] : U_phase P1916[1] : V_phase P1916[2] : W_phase				
Details:	See P1915 (identified nominal stator inductance).				
r1917[3]	Identified stator inductance 2	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level 2
	P-Group: MOTOR				
	Displays identified stator inductance.				
Index:	P1917[0] : U_phase P1917[1] : V_phase P1917[2] : W_phase				
Details:	See P1915 (identified nominal stator inductance)				
r1918[3]	Identified stator inductance 3	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level 2
	P-Group: MOTOR				
	Displays identified stator inductance.				
Index:	P1918[0] : U_phase P1918[1] : V_phase P1918[2] : W_phase				
Details:	See P1915 (identified nominal stator reactance)				
r1919[3]	Identified stator inductance 4	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level 2
	P-Group: MOTOR				
	Displays identified stator inductance.				
Index:	P1919[0] : U_phase P1919[1] : V_phase P1919[2] : W_phase				
Details:	See P1915 (identified nominal stator inductance)				
r1920[3]	Identified dyn. leak. inductance	Datatype: Float	Unit: -	Min: - Def: - Max: -	Level 2
	P-Group: MOTOR				
	Displays identified total dynamic leakage inductance.				
Index:	P1920[0] : U_phase P1920[1] : V_phase P1920[2] : W_phase				
r1925	Identified on-state voltage	Datatype: Float	Unit: V	Min: - Def: - Max: -	Level 2
	P-Group: INVERTER				
	Displays identified on-state voltage of IGBT.				
r1926	Ident. gating unit dead time	Datatype: Float	Unit: us	Min: - Def: - Max: -	Level 2
	P-Group: INVERTER				
	Displays identified dead time of gating unit interlock.				

P1930	Voltage setpoint for calibration	Min: 0	Level 4	
	CStat: CUT	Datatype: Float		Unit: V
	P-Group: INVERTER	Active: Immediately		QuickComm.: No

Specifies reference voltage for generation of a test voltage vector (e.g. used for shunt calibration).

P1931	Phase	Min: 1	Level 4	
	CStat: CUT	Datatype: U16		Unit: -
	P-Group: INVERTER	Active: Immediately		QuickComm.: No

Defines phase of voltage vector

P1960	Speed control optimisation	Min: 0	Level 3	
	CStat: CT	Datatype: U16		Unit: -
	P-Group: MOTOR	Active: first confirm		QuickComm.: Yes

The drive should be set into a vector mode (P1300 = 20 or 21) to carry out speed controller optimisation. When speed controller optimisation is enabled (P1960 = 1) the warning A0542 will become active.

When the drive is next started it will do the optimisation tests.

The drive will accelerate the motor to 20 % of P0310 (rated motor frequency) using the ramp up time P1120 and then under torque control go to 50 % of P0310 (rated motor frequency).

The drive will then ramp back down to 20 % using the ramp down time P1121.

This procedure is repeated several times and then average time taken.

From this an estimation of the inertia of the load on the motor can be derived.

From this the inertia ratio parameter (P0342) and the Kp gains for VC (P1460) and SLVC (P1470) are modified to give a response suitable for the measured inertia.

Possible Settings:

- 0 Disable
- 1 Enable

Notice:

If there is a problem due to instability the drive may trip with an F0042 fault if a stable value has not been obtained on the ramp up within a reasonable time.

It should be noted that the Dc link controller should be enabled whilst doing the test as otherwise overvoltage trips may be experienced.

This will however depend on the ramp down time and the system inertia.

The speed loop optimisation may not be suitable for some applications due to the nature of the test i.e. accelerating under torque control from 20 % to 50 %.

Note:

When the test is complete P1960 will be cleared to zero.

P2000[3]	Reference frequency	Min: 1.00	Level 2	
	CStat: CT	Datatype: Float		Unit: Hz
	P-Group: COMM	Active: first confirm		QuickComm.: No

Parameter P2000 represents the reference frequency for frequency values which are displayed/transferred as a percentage or a hexadecimal value.

Where:

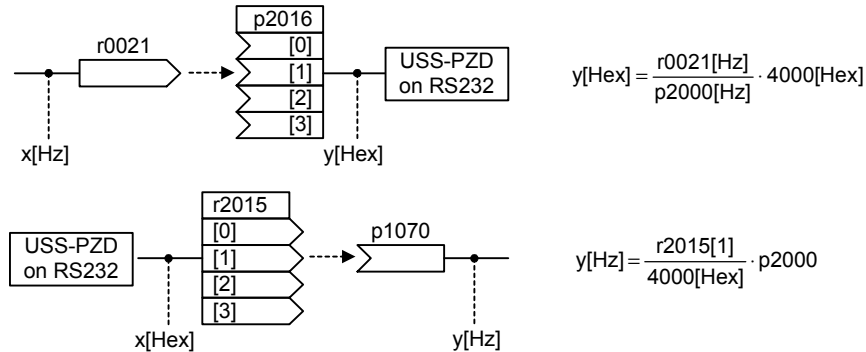
- hexadecimal 4000 H ==> P2000 (e.g.: USS-PZD)
- percentage 100 % ==> P2000

Index:

- P2000[0] : 1st. Drive data set (DDS)
- P2000[1] : 2nd. Drive data set (DDS)
- P2000[2] : 3rd. Drive data set (DDS)

Example:

If a BICO connection is made between two parameters or alternatively using P0719 or P1000, the 'unit' of the parameters (standardized (Hex) or physical (i.e. Hz) values) may differ. In this case an automatic conversion to the target value will be done.



Notice:

Reference parameters are intended as an aid to presenting setpoint and actual value signals in a uniform manner.

This also applies to fixed settings entered as a percentage.

A value of 100 % corresponds to a process data value of 4000H, or 4000 0000H in the case of double values.

In this respect, the following parameters are available:

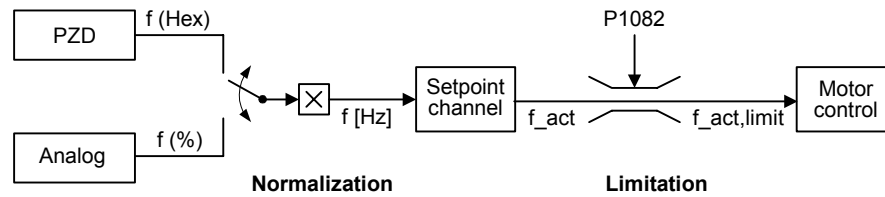
p2000	Reference frequency	Hz
p2001	Reference voltage	V
p2002	Reference current	A
p2003	Reference torque	Nm
p2004	Reference power	kW hp

— f(p0100)



Caution:

Parameter P2000 represents the reference frequency of the above mentioned interfaces. A maximum frequency setpoint of 2*P2000 can be applied via the corresponding interface. Unlike parameter P1082 (Max. Frequency) this limits the inverter frequency internally independent of the reference frequency. By modification of P2000 it will also adapt the parameter to the new settings.



$$f[\text{Hz}] = \frac{f(\text{Hex})}{4000(\text{Hex})} \cdot p2000 = \frac{f(\%)}{100\%} \cdot P2000$$

$$f_{\text{act,limit}} = \min(p1082, f_{\text{act}})$$

P2001[3]	Reference voltage	Datatype: U16	Unit: V	Min: 10	Level 3
	CStat: CT	Active: first confirm	QuickComm.: No	Def: 1000	
	P-Group: COMM			Max: 2000	

Full-scale output voltage (i.e. 100 %) used over serial link (corresponds to 4000H).

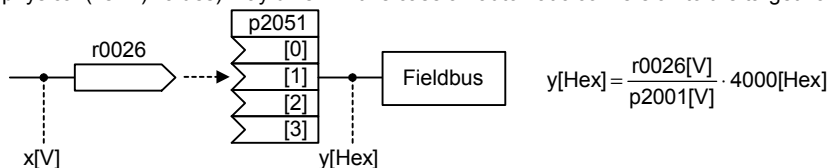
Index:

- P2001[0] : 1st. Drive data set (DDS)
- P2001[1] : 2nd. Drive data set (DDS)
- P2001[2] : 3rd. Drive data set (DDS)

Example:

P2001 = 230 specifies that 4000H received via USS denotes 230 V.

If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. V) values) may differ. In this case an automatic conversion to the target value will be done.



P2002[3]	Reference current	Datatype: Float	Unit: A	Min: 0.10	Level 3
	CStat: CT	Active: first confirm	QuickComm.: No	Def: 0.10	
	P-Group: COMM			Max: 10000.00	

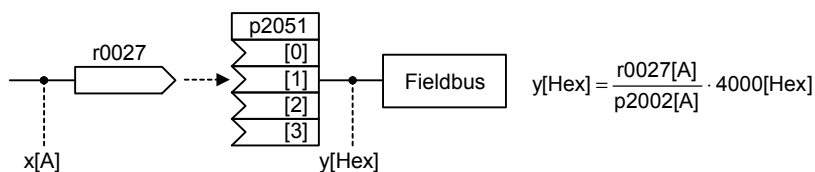
Full-scale output current used over serial link (corresponds to 4000H).

Index:

- P2002[0] : 1st. Drive data set (DDS)
- P2002[1] : 2nd. Drive data set (DDS)
- P2002[2] : 3rd. Drive data set (DDS)

Example:

If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. A) values) may differ. In this case an automatic conversion to the target value will be done.



P2003[3]	Reference torque	Datatype: Float	Unit: Nm	Min: 0.10	Level 3
	CStat: CT	Active: first confirm	QuickComm.: No	Def: 0.75	
	P-Group: COMM			Max: 99999.00	

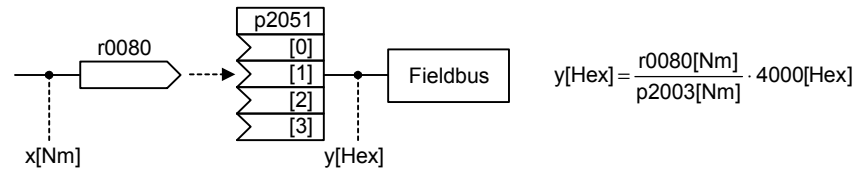
Full-scale reference torque used over the serial link (corresponds to 4000H).

Index:

- P2003[0] : 1st. Drive data set (DDS)
- P2003[1] : 2nd. Drive data set (DDS)
- P2003[2] : 3rd. Drive data set (DDS)

Example:

If a BICO connection is made between two parameters or alternatively using P1500, the 'unit' of the parameters (standardized (Hex) or physical (i.e. Nm) values) may differ. In this case an automatic conversion to the target value will be done.



r2004[3]	Reference power	Datatype: Float	Unit: -	Min: -	Level 3
	P-Group: COMM			Def: -	
				Max: -	

Full-scale reference power used over the serial link (corresponds to 4000H).

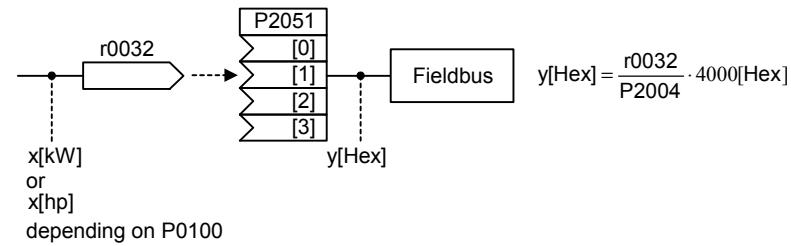
$$r2004 = \frac{1}{2} \cdot 2 \cdot \pi \cdot f \cdot M = \pi \cdot p2000 \cdot P2003$$

Index:

- P2004[0] : 1st. Drive data set (DDS)
- P2004[1] : 2nd. Drive data set (DDS)
- P2004[2] : 3rd. Drive data set (DDS)

Example:

If a BICO connection is made between two parameters, the 'unit' of the parameters (standardized (Hex) or physical (i.e. kW / hp) values) may differ. In this case an automatic conversion to the target value will be done.



P2010[2]	USS baudrate			Min: 4	Level 2
	CStat: CUT	Datatype: U16	Unit: -	Def: 8	
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max: 12	

Sets baud rate for USS communication.

Possible Settings:

- 4 2400 baud
- 5 4800 baud
- 6 9600 baud
- 7 19200 baud
- 8 38400 baud
- 9 57600 baud
- 10 76800 baud
- 11 93750 baud
- 12 115200 baud

Index:

- P2010[0] : reserved
- P2010[1] : USS on RS232

P2011[2]	USS address			Min: 0	Level 4
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max: 31	

Sets unique address for inverter.

Index:

- P2011[0] : reserved
- P2011[1] : USS on RS232

P2012[2]	USS PZD length	Datatype: U16	Unit: -	Min: 0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 2	
	P-Group: COMM			Max: 8	

Defines the number of 16-bit words in PZD part of USS telegram.

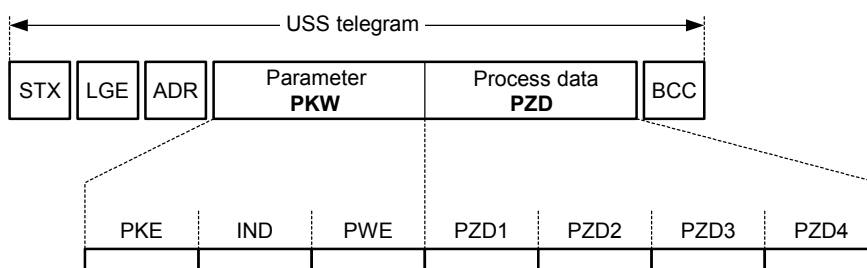
In this area, process data (PZD) are continually exchanged between the master and slaves. The PZD part of the USS telegram is used for the main setpoint, and to control the inverter.

Index:

- P2012[0] : reserved
- P2012[1] : USS on RS232

Notice:

USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively.



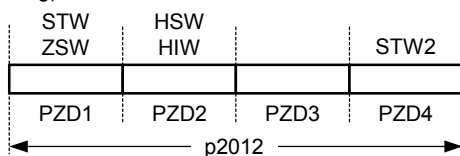
- | | | | |
|-----|-----------------------|-----|-----------------|
| STX | Start of text | PKE | Parameter ID |
| LGE | Length | IND | Sub-index |
| ADR | Address | PWE | Parameter value |
| PKW | Parameter ID value | | |
| PZD | Process data | | |
| BCC | Block check character | | |

PZD transmits a control word and setpoint or status word and actual values.

The number of PZD-words in a USS-telegram are determined by parameter P2012, where the first two words are either:

- a) control word and main setpoint or
- b) status word and actual value.

When P2012 is greater or equal to 4 the additional control word is transferred as the 4th PZD-word (default setting).



- | | | | |
|-----|--------------|-----|-------------------|
| STW | Control word | HSW | Main setpoint |
| ZSW | Status word | HIW | Main actual value |
| PZD | Process data | | |

P2013[2]	USS PKW length	Datatype: U16	Unit: -	Min: 0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 127	
	P-Group: COMM			Max: 127	

Defines the number of 16-bit words in PKW part of USS telegram.
 The PKW area can be varied.
 Depending on the particular requirement, 3-word, 4-word or variable word lengths can be parameterized.
 The PKW part of the USS telegram is used to read and write individual parameter values.

Possible Settings:

- 0 No words
- 3 3 words
- 4 4 words
- 127 Variable

Index:

- P2013[0] : reserved
- P2013[1] : USS on RS232

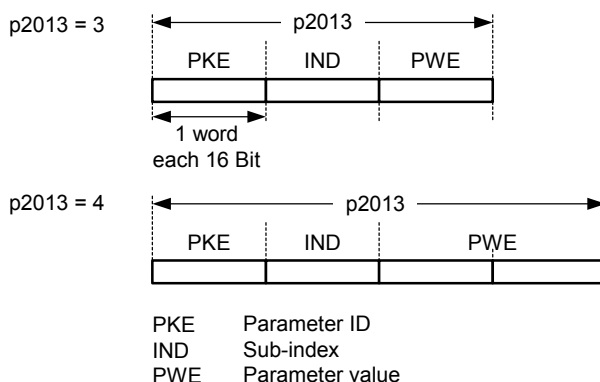
Example:

	Data type		
	U16 (16 Bit)	U32 (32 Bit)	Float (32 Bit)
p2013 = 3	X	Parameter access fault	Parameter access fault
p2013 = 4	X	X	X
p2013 = 127	X	X	X

Notice:

USS protocol consists of PZD and PKW which can be changed by the user via parameters P2012 and P2013 respectively.

Parameter P2013 determines the number of PKW-words in a USS-telegram.
 Setting P2013 to 3 or 4 determines the length of the PKW words (3 = three words and 4 = four words).
 When P2013 set to 127 automatically adjusts the length of the PKW words are required.



If a fixed PKW length is selected only one parameter value can be transferred.
 In the case of indexed parameter, you must use the variable PKW length if you wish to have the values of all indices transferred in a single telegram.
 In selecting the fixed PKW length, it is important to ensure the value in question can be transferred using this PKW length.

P2013 = 3, fixes PKW length, but does not allow access to many parameter values.
 A parameter fault is generated when an out-of-range value is used, the value will not be accepted but the inverter state will not be affected.
 Useful for applications where parameters are not changed, but MM3s are also used.
 Broadcast mode is not possible with this setting.

P2013 = 4, fixes PKW length.
 Allows access to all parameters, but indexed parameters can only be read one index at a time.
 Word order for single word values are different to setting 3 or 127, see example below.

P2013 = 127, most useful setting.
 PKW reply length varies depending on the amount of information needed.
 Can read fault information and all indices of a parameter with a single telegram with this setting.

Example:
 P0700 must be set to value 6 (0700 = 2BC (hex))

	p2013 = 3	p2013 = 4	p2013 = 127
Master → ET200S FC	22BC 0000 0006	22BC 0000 0000 0006	22BC 0000 0006 0000
ET200S FC → Master	12BC 0000 0006	12BC 0000 0000 0006	12BC 0000 0006

P2014[2]	USS telegram off time	Min: 0	Level 3
	CStat: CT Datatype: U16 Unit: ms Def: 0		
	P-Group: COMM Active: Immediately QuickComm.: No Max: 65535		

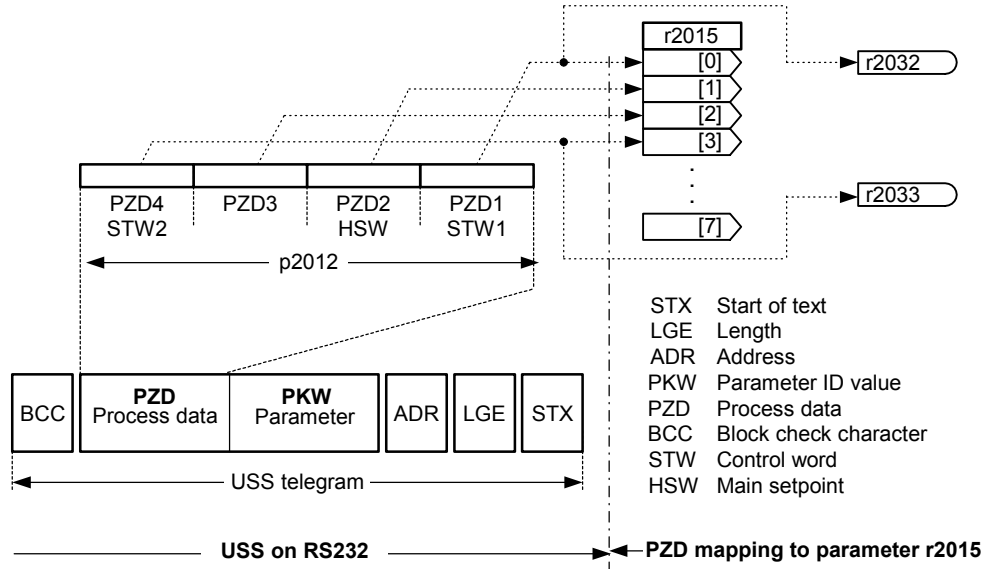
Defines a time T_off after which a fault will be generated (F0071) if no telegram is received via the USS channels.

Index:
 P2014[0] : reserved
 P2014[1] : USS on RS232

Notice:
 By default (time set to 0), no fault is generated (i.e. watchdog disabled).

r2015[8]	CO: PZD from USS on RS232	Min: -	Level 3
	Datatype: U16 Unit: - Def: -		
	P-Group: COMM Max: -		

Displays process data received via USS on RS232.



Index:

- P2015[0] : Received word 0
- P2015[1] : Received word 1
- P2015[2] : Received word 2
- P2015[3] : Received word 3
- P2015[4] : Received word 4
- P2015[5] : Received word 5
- P2015[6] : Received word 6
- P2015[7] : Received word 7

Note:

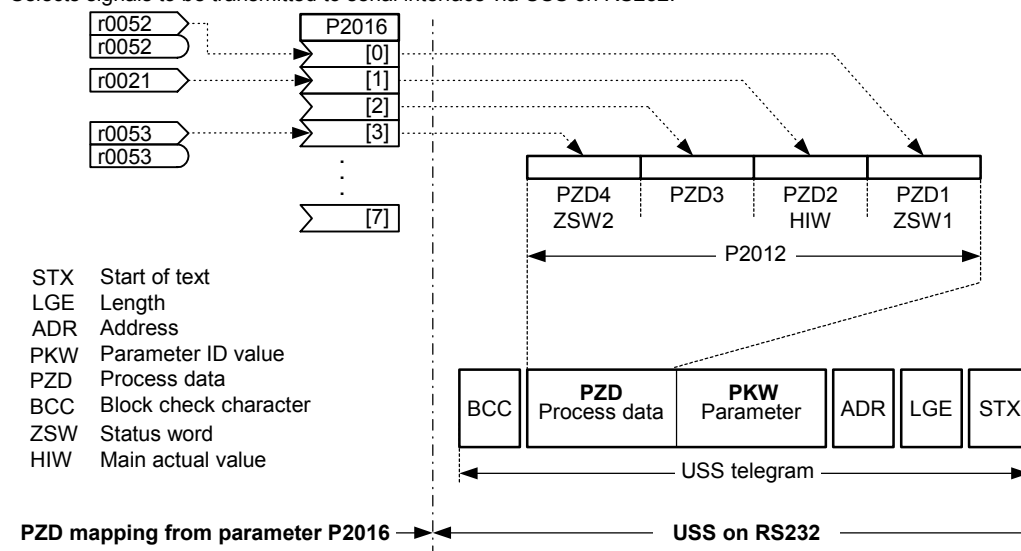
The control words can be viewed as bit parameters r2032 and r2033.

Restrictions:

- If the above serial interface controls the inverter (P0700 or P0719) then the 1st control word must be transferred in the 1st PZD-word.
- If the setpoint source is selected via P1000 or P0719, then the main setpoint must be transferred in the 2nd PZD-word,
- When P2012 is greater than or equal to 4 the additional control word (2nd control word) must transferred in the 4th PZD-word, if the above serial interface controls the inverter (P0700 or P0719).

P2016[8]	CI: PZD to USS on RS232				Min: 0:0	Level 3
	CStat: CT	Datatype: U32	Unit: -	Def: 52:0		
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max: 40000:0		

Selects signals to be transmitted to serial interface via USS on RS232.



This parameter allows the user to define the source of the status words and actual values for the reply PZD.

Index:

- P2016[0] : Transmitted word 0
- P2016[1] : Transmitted word 1
- P2016[2] : Transmitted word 2
- P2016[3] : Transmitted word 3
- P2016[4] : Transmitted word 4
- P2016[5] : Transmitted word 5
- P2016[6] : Transmitted word 6
- P2016[7] : Transmitted word 7

Example:

P2016[0] = 52.0 (default). In this case, the value of r0052 (CO/BO: Status word) is transmitted as 1st PZD to the USS on RS232.

Note:

If r0052 not indexed, display does not show an index (".0").

r2024[2]	USS error-free telegrams	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays number of error-free USS telegrams received.				
Index:	P2024[0] : reserved P2024[1] : USS on RS232				
r2025[2]	USS rejected telegrams	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays number of USS telegrams rejected.				
Index:	P2025[0] : reserved P2025[1] : USS on RS232				
r2026[2]	USS character frame error	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays number of USS character frame errors.				
Index:	P2026[0] : reserved P2026[1] : USS on RS232				
r2027[2]	USS overrun error	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays number of USS telegrams with overrun error.				
Index:	P2027[0] : reserved P2027[1] : USS on RS232				
r2028[2]	USS parity error	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays number of USS telegrams with parity error.				
Index:	P2028[0] : reserved P2028[1] : USS on RS232				
r2029[2]	USS start not identified	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays number of USS telegrams with unidentified start.				
Index:	P2029[0] : reserved P2029[1] : USS on RS232				
r2030[2]	USS BCC error	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays number of USS telegrams with BCC error.				
Index:	P2030[0] : reserved P2030[1] : USS on RS232				
r2031[2]	USS length error	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays number of USS telegrams with incorrect length.				
Index:	P2031[0] : reserved P2031[1] : USS on RS232				

r2032	BO: CtrlWrd1 from USS on RS232	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: COMM			Def: - Max: -	

Displays control word 1 from USS on RS232 (word 1 within USS).

Bitfields:

Bit00	ON/OFF1	0	No	1	Yes
Bit01	OFF2: Electrical stop	0	Yes	1	No
Bit02	OFF3: Fast stop	0	Yes	1	No
Bit03	Pulse enable	0	No	1	Yes
Bit04	RFG enable	0	No	1	Yes
Bit05	RFG start	0	No	1	Yes
Bit06	Setpoint enable	0	No	1	Yes
Bit07	Fault acknowledge	0	No	1	Yes
Bit08	JOG right	0	No	1	Yes
Bit09	JOG left	0	No	1	Yes
Bit10	Control from PLC	0	No	1	Yes
Bit11	Reverse (setpoint inversion)	0	No	1	Yes
Bit15	CDS Bit 0 (Hand/Auto)	0	No	1	Yes

r2033	BO: CtrlWrd2 from USS on RS232	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: COMM			Def: - Max: -	

Displays control word 2 from USS on RS232 (i.e. word 4 within USS).

Bitfields:

Bit04	Drive data set (DDS) Bit 0	0	No	1	Yes
Bit05	Drive data set (DDS) Bit 1	0	No	1	Yes
Bit11	Enable Droop	0	No	1	Yes
Bit12	Torque control	0	No	1	Yes
Bit13	External fault 1	0	Yes	1	No
Bit15	Command data set (CDS) Bit 1	0	No	1	Yes

Dependency:

P0700 = 4 (USS on RS232) and P0719 = 0 (Cmd / Setpoint = BICO parameter).

P2040	Fieldbus telegram off time			Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: ms	Def: 500	
	P-Group: COMM	Active: Immediately	QuickComm.: No	Max: 65535	

Defines time after which a fault will be generated (F0070) if no telegram is received via the link.

Dependency:

Setting 0 = watchdog disabled

P2041[5]	CB parameter			Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max: 65535	

Configures the PLC.

Index:

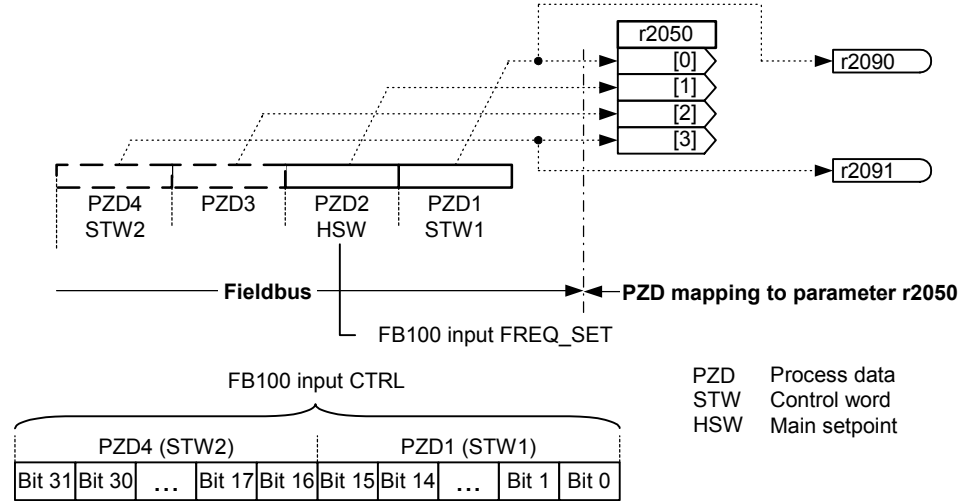
P2041[0]	: CB parameter 0
P2041[1]	: CB parameter 1
P2041[2]	: CB parameter 2
P2041[3]	: CB parameter 3
P2041[4]	: CB parameter 4

Details:

for protocol definition and appropriate settings see PLC interface description.

r2050[8]	CO: PZD from Fieldbus	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: COMM			Def: -	
				Max: -	

Displays PZD received from PLC.



Index:

- P2050[0] : Received word 0
- P2050[1] : Received word 1
- P2050[2] : Received word 2
- P2050[3] : Received word 3
- P2050[4] : Received word 4
- P2050[5] : Received word 5
- P2050[6] : Received word 6
- P2050[7] : Received word 7

Note:

The control words can be viewed as bit parameters r2090 and r2091.

P2051[8]	CI: PZD to Fieldbus	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CT	Active: Immediately	QuickComm.: No	Def: 52:0	
	P-Group: COMM			Max: 40000:0	

Connects PZD to Fieldbus. Details see Operating Instructions, chapter "Connection to SIMATIC S7"

Index:

- P2051[0] : Transmitted word 0
- P2051[1] : Transmitted word 1
- P2051[2] : Transmitted word 2
- P2051[3] : Transmitted word 3
- P2051[4] : Transmitted word 4
- P2051[5] : Transmitted word 5
- P2051[6] : Transmitted word 6
- P2051[7] : Transmitted word 7

r2053[5]	CB identification	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays identification data of the PLC. The different PLC types (r2053[0]) are given in the Enum declaration.				
	Possible Settings:				
	0 No CB option board				
	1 PROFIBUS DP				
	2 DeviceNet				
	256 not defined				
	Index:				
	P2053[0] : CB type (PROFIBUS = 1)				
	P2053[1] : Firmware version				
	P2053[2] : Firmware version detail				
	P2053[3] : Firmware date (year)				
	P2053[4] : Firmware date (day/month)				
r2054[7]	CB diagnosis	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays diagnostic information of PLC.				
	Index:				
	P2054[0] : CB diagnosis 0				
	P2054[1] : CB diagnosis 1				
	P2054[2] : CB diagnosis 2				
	P2054[3] : CB diagnosis 3				
	P2054[4] : CB diagnosis 4				
	P2054[5] : CB diagnosis 5				
	P2054[6] : CB diagnosis 6				
r2059[5]	CO: Displays SOL link stats for Sol	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 4
	P-Group: COMM				
	Displays SOL link stats for Sol Master.				
	Index:				
	P2059[0] : messages txd				
	P2059[1] : valid messages rxd				
	P2059[2] : crc errors				
	P2059[3] : stx errors				
	P2059[4] : reconfigurations				
r2090	BO: Control word 1 from Fieldbus	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: COMM				
	Displays control word 1 received from PLC.				
	Bitfields:				
	Bit00	ON/OFF1	0	No	1 Yes
	Bit01	OFF2: Electrical stop	0	Yes	1 No
	Bit02	OFF3: Fast stop	0	Yes	1 No
	Bit03	Pulse enable	0	No	1 Yes
	Bit04	RFG enable	0	No	1 Yes
	Bit05	RFG start	0	No	1 Yes
	Bit06	Setpoint enable	0	No	1 Yes
	Bit07	Fault acknowledge	0	No	1 Yes
	Bit08	JOG right	0	No	1 Yes
	Bit09	JOG left	0	No	1 Yes
	Bit10	Control from PLC	0	No	1 Yes
	Bit11	Reverse (setpoint inversion)	0	No	1 Yes
	Bit15	CDS Bit 0 (Hand/Auto)	0	No	1 Yes
	Note:				
	If P0700 = 6 (Profibus) then P810 must be set to 2090.15 for correct operation. This will not be cleared automatically when P0700 is no longer equal to 6.				
	Details:				
	See relevant PLC interface description for protocol definition and appropriate settings.				

r2091	BO: Control word 2 from Fieldbus	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
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Displays control word 2 received from PLC.

Bitfields:

Bit04	Drive data set (DDS) Bit 0	0	No	1	Yes
Bit05	Drive data set (DDS) Bit 1	0	No	1	Yes
Bit11	Enable Droop	0	No	1	Yes
Bit12	Torque control	0	No	1	Yes
Bit13	External fault 1	0	Yes	1	No
Bit15	Command data set (CDS) Bit 1	0	No	1	Yes

Details:

See relevant PLC interface description for protocol definition and appropriate settings.

P2100[3]	Alarm number selection	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 65535	Level 3
-----------------	-------------------------------	----------------------	----------------	---	--------------------------

Selects up to 3 faults or warnings for non-default reactions.

Index:

P2100[0]	: Fault Number 1
P2100[1]	: Fault Number 2
P2100[2]	: Fault Number 3

Example:

If you want F0005 to perform an OFF3 instead of an OFF2, set P2100[0] = 5, then select the desired reaction in P2101[0] (in this case, set P2101[0] = 3).

Note:

All fault codes have a default reaction to OFF2.
Some fault codes caused by hardware trips (e.g. overcurrent) cannot be changed from the default reactions.

P2101[3]	Stop reaction value	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 4	Level 3
-----------------	----------------------------	----------------------	----------------	---	--------------------------

Sets drive stop reaction values for fault selected by P2100 (alarm number stop reaction).

This indexed parameter specifies the special reaction to the faults/warnings defined in P2100 indices 0 to 2.

Possible Settings:

0	No reaction, no display
1	OFF1 stop reaction
2	OFF2 stop reaction
3	OFF3 stop reaction
4	No reaction warning only

Index:

P2101[0]	: Stop reaction value 1
P2101[1]	: Stop reaction value 2
P2101[2]	: Stop reaction value 3

Note:

Settings 0 - 3 only are available for fault codes.

Settings 0 and 4 only are available for warnings.
Index 0 (P2101) refers to fault/warning in index 0 (P2100).

P2103[3]	BI: 1. Faults acknowledgement	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 4
-----------------	--------------------------------------	----------------------	----------------	---	--------------------------

Defines first source of fault acknowledgement, e.g. keypad/DIN, etc. (depending on setting).

Index:

P2103[0]	: 1st. Command data set (CDS)
P2103[1]	: 2nd. Command data set (CDS)
P2103[2]	: 3rd. Command data set (CDS)

P2104[3]	BI: 2. Faults acknowledgement	CStat: CT	Datatype: U32	Unit: -	Min: 0:0	Def: 2090:7	Max: 40000:0	Level 4
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No					
	Selects second source of fault acknowledgement.							
	Index:							
	P2104[0] : 1st. Command data set (CDS)							
	P2104[1] : 2nd. Command data set (CDS)							
	P2104[2] : 3rd. Command data set (CDS)							
P2106[3]	BI: External fault	CStat: CT	Datatype: U32	Unit: -	Min: 0:0	Def: 1:0	Max: 40000:0	Level 3
	P-Group: COMMANDS	Active: first confirm	QuickComm.: No					
	Selects source of external faults.							
	Index:							
	P2106[0] : 1st. Command data set (CDS)							
	P2106[1] : 2nd. Command data set (CDS)							
	P2106[2] : 3rd. Command data set (CDS)							
r2110[4]	Warning number	Datatype: U16	Unit: -	Min: -	Def: -	Max: -	Level 2	
	P-Group: ALARM							
	Displays warning information.							
	A maximum of 2 active warnings (indices 0 and 1) and 2 historical warnings (indices 2 and 3) may be viewed.							
	Index:							
	P2110[0] : Recent Warnings --, warning 1							
	P2110[1] : Recent Warnings --, warning 2							
	P2110[2] : Recent Warnings -1, warning 3							
	P2110[3] : Recent Warnings -1, warning 4							
	Notice:							
	Indices 0 and 1 are not stored.							
P2111	Total number of warnings	CStat: CT	Datatype: U16	Unit: -	Min: 0	Def: 0	Max: 4	Level 3
	P-Group: ALARM	Active: first confirm	QuickComm.: No					
	Displays number of warning (up to 4) since last reset.							
	Set to 0 to reset the warning history.							
r2114[2]	Run time counter	Datatype: U16	Unit: -	Min: -	Def: -	Max: -	Level 3	
	P-Group: ALARM							
	Displays run time counter.							
	It is the total time the drive has been powered up.							
	When power goes value is saved, then restored on powerup.							
	The run time counter r2114 will be calculate as followed:							
	Multiply the value in r2114[0], by 65536 and then add it to the value in r2114[1].							
	The resultant answer will be in seconds.							
	This means that r2114[0] is not days.							
	Total powerup time = 65536 * r2114[0] + r2114[1] seconds.							
	When the real time is not given in P2115, the time in this parameter is used by r0948 to indicate when a fault has occurred.							
	Index:							
	P2114[0] : Syst Time, Secs, Upper Word							
	P2114[1] : Syst Time, Secs, Lower Word							
	Example:							
	If r2114[0] = 1 & r2114[1] = 20864, we get 1 * 65536 + 20864 = 86400 seconds which equals 1 day.							
	Details:							
	See r0948 (fault time)							

P2115[3]	Real time clock	Datatype: U16	Unit: -	Min: 0	Level 3
	CStat: CT	Active: Immediately	QuickComm.: No	Def: 0	
	P-Group: ALARM			Max: 65535	

Displays real time.

All inverters require an on-board clock function with which fault conditions may be timestamped and logged. However, they have no battery backed Real Time Clock (RTC). Inverters may support a software driven RTC which requires synchronisation with the RTC supplied via a serial interface.

The time is stored in a word array parameter P2115. The time will be set by USS Protocol standard "word array parameter write" telegrams. Once the last word is received in index 2, the software will start running the timer itself using internal running 1 millisecond tic. Hence becoming like RTC.

If powercycle takes place, then the real time must be sent again to the inverter.

Time is maintained in a word array parameter and encoded as follows - the same format will be used in fault report logs.

Index	High Byte (MSB)	Low Byte (LSB)
0	Seconds (0 - 59)	Minutes (0 - 59)
1	Hours (0 - 23)	Days (1 - 31)
2	Month (1 - 12)	Years (00 - 250)

Time is measured from Jan 1st 2000. Values are in binary form.

Index:

P2115[0] : Real Time, Seconds+Minutes

P2115[1] : Real Time, Hours+Days

P2115[2] : Real Time, Month+Year

Details:

See r0948 (fault time).

P2120	Indication counter	Datatype: U16	Unit: -	Min: 0	Level 4
	CStat: CUT	Active: Immediately	QuickComm.: No	Def: 0	
	P-Group: ALARM			Max: 65535	

Indicates total number of alarm events.

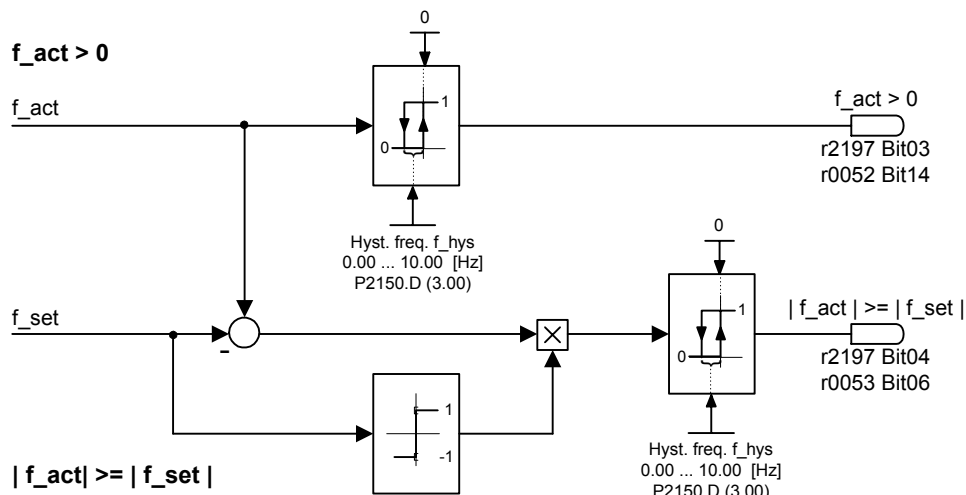
This parameter is incremented whenever an alarm event occurs.

It also gets incremented when a warning is cleared or faults are cleared.

This parameter is used by the PC tools.

P2150[3]	Hysteresis frequency f_hys	Min: 0.00	Level 3	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 3.00		
		Max: 10.00		

Defines hysteresis level applied for comparing frequency and speed to threshold as illustrated in the diagram below.



Index:

- P2150[0] : 1st. Drive data set (DDS)
- P2150[1] : 2nd. Drive data set (DDS)
- P2150[2] : 3rd. Drive data set (DDS)

P2151[3]	CI: Drehzahlswellwert für Meldung	Min: 0:0	Level 3	
	CStat: CUT	Datatype: U32		Unit: -
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 0:0		
		Max: 40000:0		

Wählt die Quelle für den Schwellwert (der Drehzahl) aus, mit dem der Ist-Wert der Drehzahl verglichen wird.

Index:

- P2151[0] : 1st. Command data set (CDS)
- P2151[1] : 2nd. Command data set (CDS)
- P2151[2] : 3rd. Command data set (CDS)

Details:

Siehe auch das Diagramm in P2150 (Hystereseffrequenz f_hys).

P2152[3]	CI: Ist-Drehzahl für Meldung	Min: 0:0	Level 3	
	CStat: CUT	Datatype: U32		Unit: -
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 0:0		
		Max: 40000:0		

Wählt die Quelle für den Istwert der Drehzahl aus, die dem Schwellwert verglichen werden soll.

Index:

- P2152[0] : 1st. Command data set (CDS)
- P2152[1] : 2nd. Command data set (CDS)
- P2152[2] : 3rd. Command data set (CDS)

Details:

Siehe die Diagramme in P2150 (Hystereseffrequenz f_hys) und P2161 (Geschwindigkeitssollwert für Meldung).

P2153[3]	Time-constant speed filter	Min: 0	Level 2	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 5		
		Max: 1000		

Specifies time constant of first-order speed filter. The filtered speed is then compared to the thresholds.

Index:

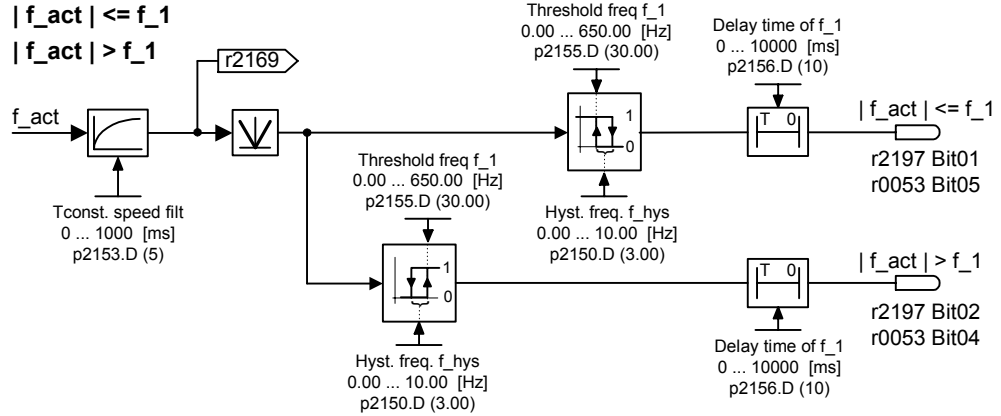
- P2153[0] : 1st. Drive data set (DDS)
- P2153[1] : 2nd. Drive data set (DDS)
- P2153[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2155, P2157 and P2159

P2155[3]	Threshold frequency f_1	Min: 0.00	Level 3	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 30.00		
		Max: 650.00		

Sets a threshold for comparing actual speed or frequency to threshold values f_1.
This threshold controls status bits 4 and 5 in status word 2 (r0053).



Index:

- P2155[0] : 1st. Drive data set (DDS)
- P2155[1] : 2nd. Drive data set (DDS)
- P2155[2] : 3rd. Drive data set (DDS)

P2156[3]	Delay time of threshold freq f_1	Min: 0	Level 3	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 10		
		Max: 10000		

Sets delay time prior to threshold frequency f_1 comparison (P2155).

Index:

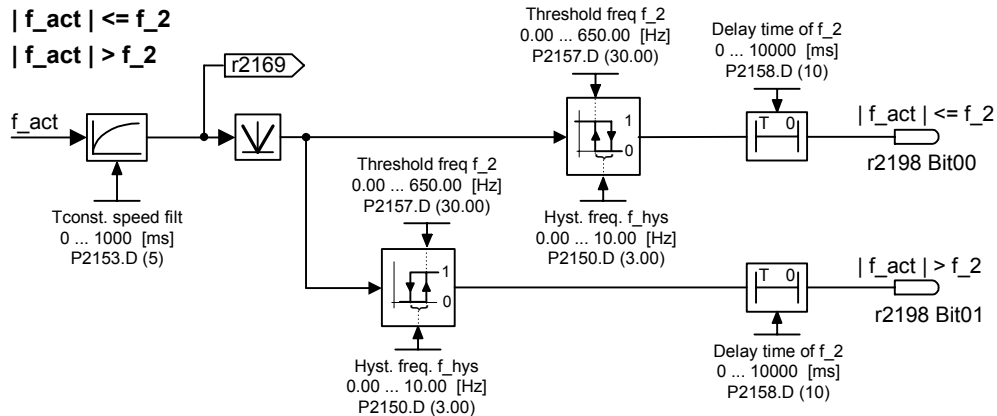
- P2156[0] : 1st. Drive data set (DDS)
- P2156[1] : 2nd. Drive data set (DDS)
- P2156[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2155 (threshold frequency f_1)

P2157[3]	Threshold frequency f₂	Min: 0.00	Level 2	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 30.00		
		Max: 650.00		

Threshold₂ for comparing speed or frequency to thresholds as illustrated in the diagram below.



Index:

- P2157[0] : 1st. Drive data set (DDS)
- P2157[1] : 2nd. Drive data set (DDS)
- P2157[2] : 3rd. Drive data set (DDS)

P2158[3]	Delay time of threshold freq f₂	Min: 0	Level 2	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 10		
		Max: 10000		

When comparing speed or frequency to threshold f₂ (P2157).
 This is the time delay before status bits are cleared.

Index:

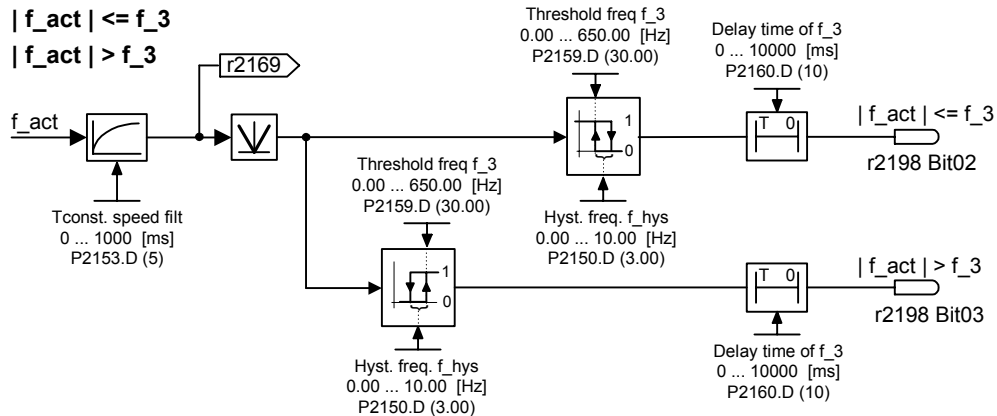
- P2158[0] : 1st. Drive data set (DDS)
- P2158[1] : 2nd. Drive data set (DDS)
- P2158[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2157 (threshold frequency f₂)

P2159[3]	Threshold frequency f_3	Min: 0.00	Level 2	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 30.00		
		Max: 650.00		

Threshold_3 for comparing speed or frequency to thresholds.



Index:

- P2159[0] : 1st. Drive data set (DDS)
- P2159[1] : 2nd. Drive data set (DDS)
- P2159[2] : 3rd. Drive data set (DDS)

P2160[3]	Delay time of threshold freq f_3	Min: 0	Level 2	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 10		
		Max: 10000		

When comparing speed or frequency to threshold f_3 (P2159). This is the time delay before status bits are set.

Index:

- P2160[0] : 1st. Drive data set (DDS)
- P2160[1] : 2nd. Drive data set (DDS)
- P2160[2] : 3rd. Drive data set (DDS)

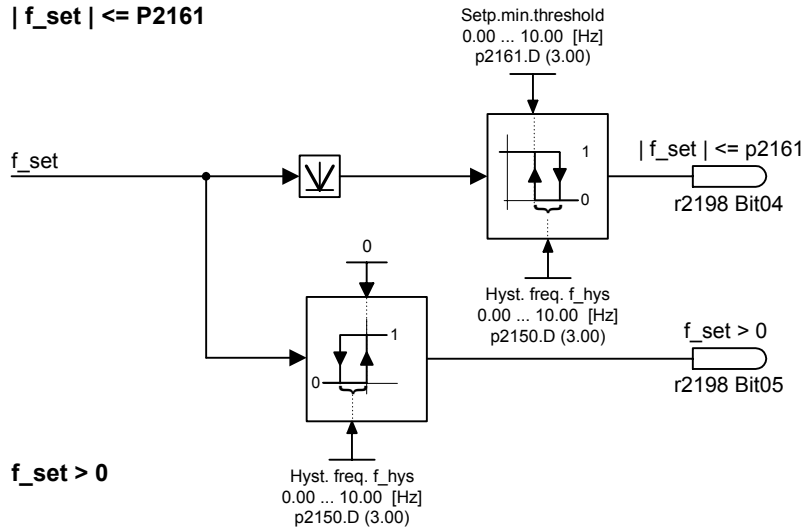
Details:

See diagram in P2159 (threshold frequency f_3)

P2161[3]	Min. threshold for freq. setp.	Unit: Hz	Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Def: 3.00	
	P-Group: ALARM	Active: Immediately	QuickComm.: No	

Minimum threshold value for comparing speed or frequency setpoint.

$| f_set | \leq P2161$



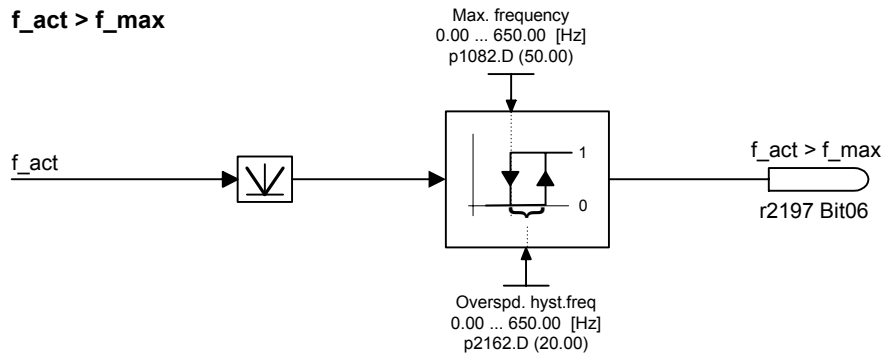
Index:

- P2161[0] : 1st. Drive data set (DDS)
- P2161[1] : 2nd. Drive data set (DDS)
- P2161[2] : 3rd. Drive data set (DDS)

P2162[3]	Hysteresis freq. for overspeed	Unit: Hz	Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Def: 20.00	
	P-Group: ALARM	Active: Immediately	QuickComm.: No	

Hysteresis speed (or frequency) for overspeed-detection as illustrated in the diagram below.

$f_act > f_max$



Index:

- P2162[0] : 1st. Drive data set (DDS)
- P2162[1] : 2nd. Drive data set (DDS)
- P2162[2] : 3rd. Drive data set (DDS)

P2163[3]	Entry freq. for perm. deviation	Unit: Hz	Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Def: 3.00	
	P-Group: ALARM	Active: Immediately	QuickComm.: No	

Threshold for detecting speed deviation from setpoint.

Index:

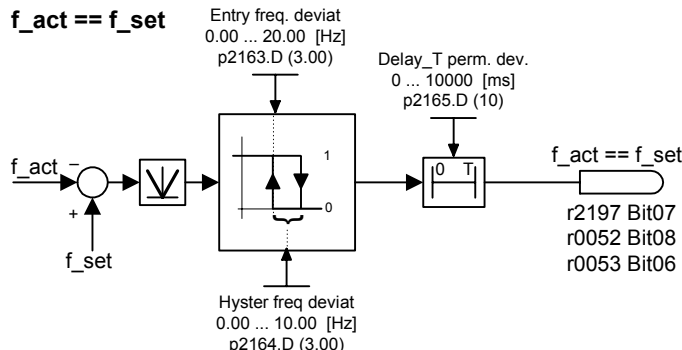
- P2163[0] : 1st. Drive data set (DDS)
- P2163[1] : 2nd. Drive data set (DDS)
- P2163[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2164.

P2164[3]	Hysteresis frequency deviation	Min: 0.00	Level 3	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: ALARM	Active: Immediately		QuickComm.: No

Hysteresis frequency for detecting permitted deviation (from setpoint) or frequency or speed. This frequency controls bit 8 in status word 1 (r0052) and bit 6 in status word 2 (r0053).



Index:

- P2164[0] : 1st. Drive data set (DDS)
- P2164[1] : 2nd. Drive data set (DDS)
- P2164[2] : 3rd. Drive data set (DDS)

P2165[3]	Delay time permitted deviation	Min: 0	Level 2	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No

Delay time for detecting permitted deviation of speed or frequency from setpoint.

Index:

- P2165[0] : 1st. Drive data set (DDS)
- P2165[1] : 2nd. Drive data set (DDS)
- P2165[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2164.

P2166[3]	Delay time ramp up completed	Min: 0	Level 2	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No

Delay time for signal that indicates completion of ramp-up.

Index:

- P2166[0] : 1st. Drive data set (DDS)
- P2166[1] : 2nd. Drive data set (DDS)
- P2166[2] : 3rd. Drive data set (DDS)

Details:

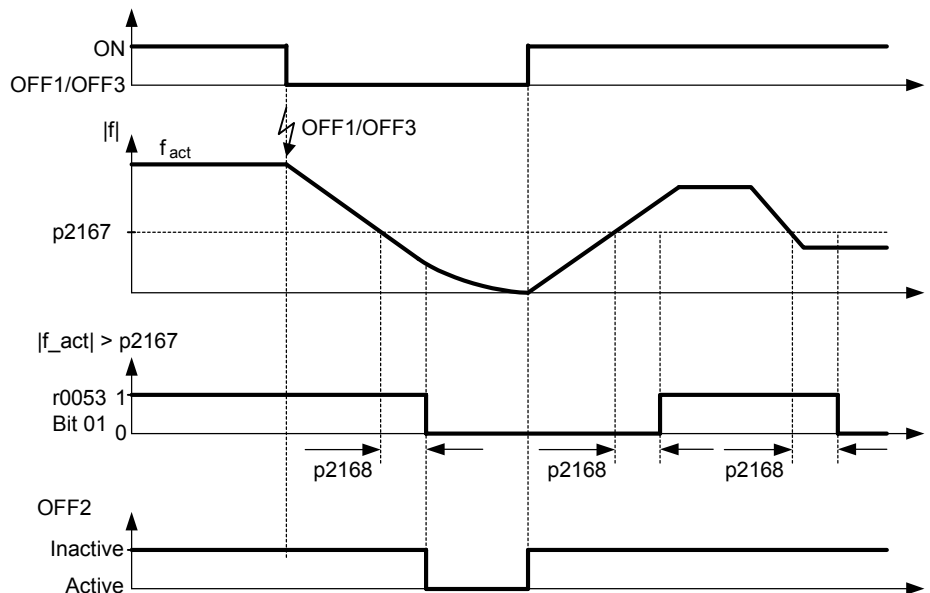
See diagram in P2174.

P2167[3]	Switch-off frequency f_{off}	Min: 0.00	Level 3	
	CStat: CUT	Datatype: Float		Unit: Hz
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 1.00		
		Max: 10.00		

Defines the threshold of the monitoring function $|f_{act}| > P2167 (f_{off})$.

P2167 influences following functions:

- If the actual frequency falls below this threshold and the time delay has expired, bit 1 in status word 2 (r0053) is reset.
- If a OFF1 or OFF3 was applied and bit 1 is reset the inverter will disable the pulse (OFF2).



Index:

- P2167[0] : 1st. Drive data set (DDS)
- P2167[1] : 2nd. Drive data set (DDS)
- P2167[2] : 3rd. Drive data set (DDS)

P2168[3]	Delay time T_{off}	Min: 0	Level 3	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 10		
		Max: 10000		

Defines time for which the inverter may operate below switch-off frequency (P2167) before switch off occurs.

Index:

- P2168[0] : 1st. Drive data set (DDS)
- P2168[1] : 2nd. Drive data set (DDS)
- P2168[2] : 3rd. Drive data set (DDS)

Dependency:

Active if holding brake (P1215) not parameterized.

Details:

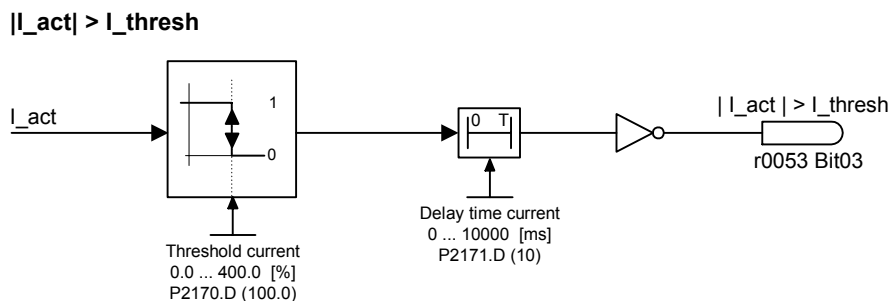
See diagram in P2167 (switch-off frequency)

r2169	CO: Act. filtered frequency	Min: -	Level 2	
		Datatype: Float		Unit: Hz
	P-Group: ALARM			Def: -
		Max: -		

Filtered speed (or frequency) for monitoring behind first-order lowpass filter.

P2170[3]	Threshold current I_thresh				Min: 0.0	Level 3
	CStat: CUT	Datatype: Float	Unit: %	Def: 100.0		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 400.0		

Defines threshold current in [%] relative to P0305 (rated motor current) to be used in comparisons of I_act and I_Thresh as illustrated in the diagram below.

**Index:**

P2170[0] : 1st. Drive data set (DDS)
P2170[1] : 2nd. Drive data set (DDS)
P2170[2] : 3rd. Drive data set (DDS)

Note:

This threshold controls bit 3 in status word 3 (r0053).

P2171[3]	Delay time current				Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: ms	Def: 10		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 10000		

Defines delay time prior to activation of current comparison.

Index:

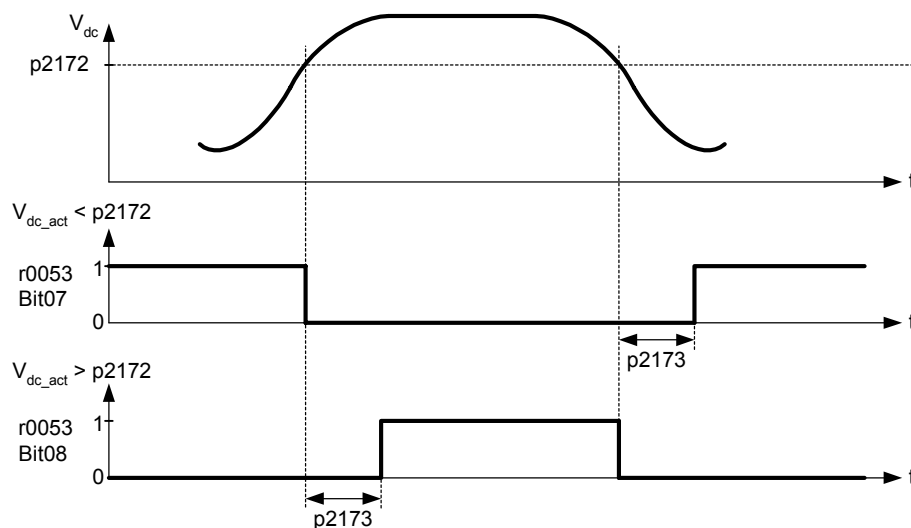
P2171[0] : 1st. Drive data set (DDS)
P2171[1] : 2nd. Drive data set (DDS)
P2171[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2170 (threshold current I_thresh)

P2172[3]	Threshold DC-link voltage	Min: 0	Level 3	
	CStat: CUT	Datatype: U16		Unit: V
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 800		
		Max: 2000		

Defines DC link voltage to be compared to actual voltage as illustrated in the diagram below.



Index:

- P2172[0] : 1st. Drive data set (DDS)
- P2172[1] : 2nd. Drive data set (DDS)
- P2172[2] : 3rd. Drive data set (DDS)

Note:

This voltage controls bits 7 and 8 in status word 3 (r0053).

P2173[3]	Delay time DC-link voltage	Min: 0	Level 3	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No
		Def: 10		
		Max: 10000		

Defines delay time prior to activation of threshold comparison.

Index:

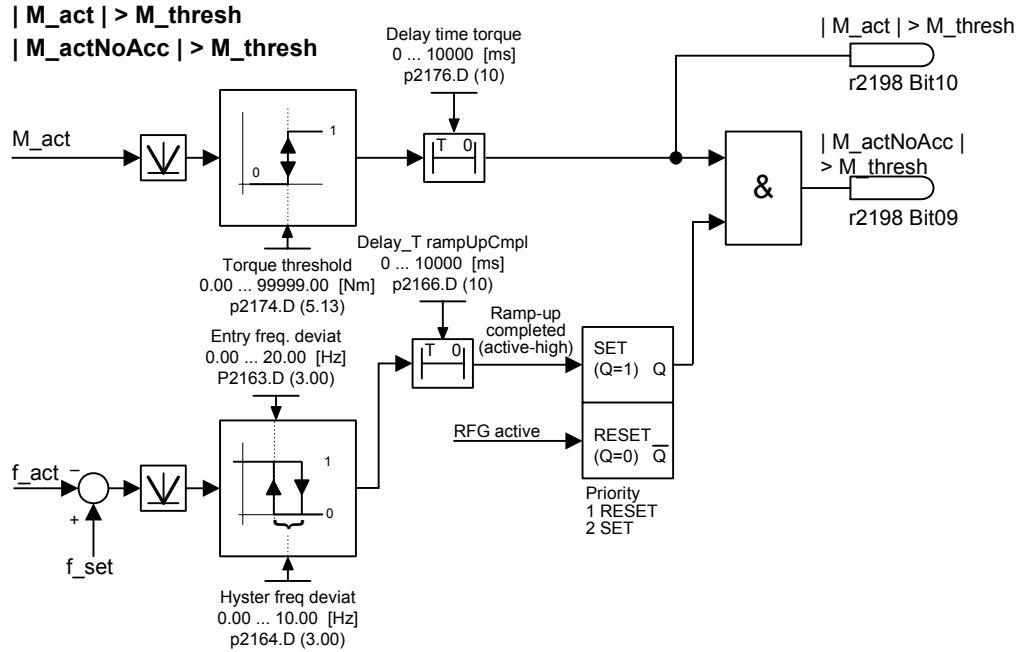
- P2173[0] : 1st. Drive data set (DDS)
- P2173[1] : 2nd. Drive data set (DDS)
- P2173[2] : 3rd. Drive data set (DDS)

Details:

See diagram in P2172 (threshold DC-link voltage)

P2174[3]	Torque threshold M_thresh	Min: 0.00	Level
CStat: CUT	Datatype: Float	Def: 5.13	2
P-Group: ALARM	Active: Immediately	QuickComm.: No	
		Max: 99999.00	

Defines torque threshold for comparing actual torque.



Index:

- P2174[0] : 1st. Drive data set (DDS)
- P2174[1] : 2nd. Drive data set (DDS)
- P2174[2] : 3rd. Drive data set (DDS)

P2176[3]	Delay time for torque threshold	Min: 0	Level
CStat: CUT	Datatype: U16	Unit: ms	2
P-Group: ALARM	Active: Immediately	QuickComm.: No	
		Def: 10	
		Max: 10000	

Delay time for comparing actual torque to threshold.

Index:

- P2176[0] : 1st. Drive data set (DDS)
- P2176[1] : 2nd. Drive data set (DDS)
- P2176[2] : 3rd. Drive data set (DDS)

P2177[3]	Delay time for motor is blocked	Min: 0	Level
CStat: CUT	Datatype: U16	Unit: ms	2
P-Group: ALARM	Active: Immediately	QuickComm.: No	
		Def: 10	
		Max: 10000	

Delay time for identification that motor is blocked.

Index:

- P2177[0] : 1st. Drive data set (DDS)
- P2177[1] : 2nd. Drive data set (DDS)
- P2177[2] : 3rd. Drive data set (DDS)

P2178[3]	Delay time for motor pulled out	Min: 0	Level 2	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No

Delay time for identification that motor is pulled out.

Index:

- P2178[0] : 1st. Drive data set (DDS)
- P2178[1] : 2nd. Drive data set (DDS)
- P2178[2] : 3rd. Drive data set (DDS)

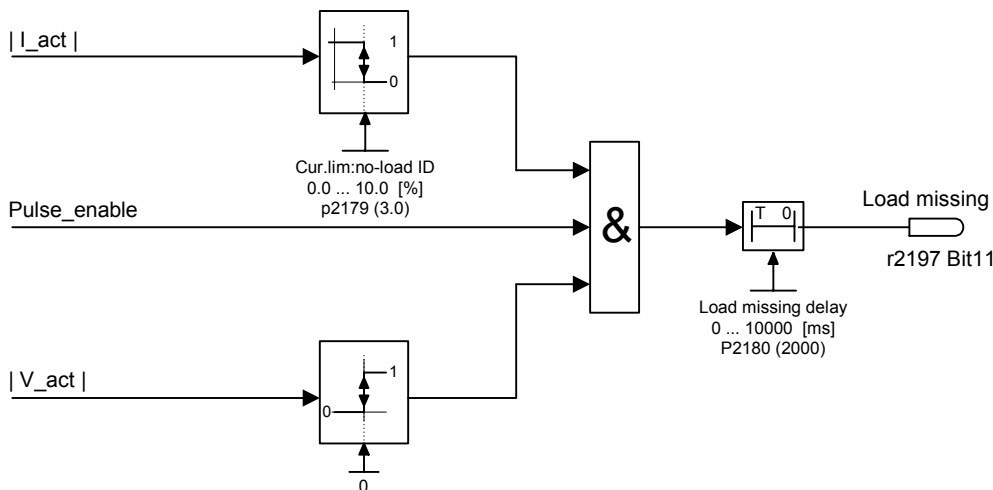
Note:

If the Encoder is enabled (P0400 > 0) and the Motor Holding Brake is enabled (P1215 > 0), then in order to stop encoder loss trips when the brake is applied, the delay time for motor pulled out should be > brake holding times (i.e. P2178 > P1216 and P2178 > P1217).

P2179	Current limit for no load ident.	Min: 0.0	Level 3	
	CStat: CUT	Datatype: Float		Unit: %
	P-Group: ALARM	Active: Immediately		QuickComm.: No

Threshold current for A0922 (load missing) in [%] relative to P0305 (rated motor current) as illustrated in the diagram below.

Load missing



Notice:

If a motor setpoint cannot be entered and the current limit (P2179) is not exceeded, Alarm A0922 (no load applied) is issued when delay time (P2180) expires.

Note:

It may be that the motor is not connected (load missing) or a phase could be missing.

P2180	Delay time for load missing	Min: 0	Level 3	
	CStat: CUT	Datatype: U16		Unit: ms
	P-Group: ALARM	Active: Immediately		QuickComm.: No

Delay time load missing

Notice:

If a motor setpoint cannot be entered and the current limit (P2179) is not exceeded, alarm A0922 (no load applied) is issued when delay time (P2180) expires.

Note:

It may be that the motor is not connected (load missing) or a phase could be missing.

Details:

See diagram in P2179 (current limit for no load identification).

P2181[3]	Belt failure detection mode				Min: 0	Level 2
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: ALARM	Active: first confirm	QuickComm.: No	Max: 6		

Sets belt failure detection mode.

This function allows detection of mechanical failure of the drive train, e.g. a broken drive belt.

It can also detect conditions which cause an overload, such as a jam. Parameters P2182-2190 are set to default when this parameter is changed from 0.

This is achieved by comparing the actual frequency/torque curve with a programmed envelope (see P2182 - P2190).

If the curve falls outside the envelope, a warning or trip is generated.

Possible Settings:

- 0 Belt failure detection disabled
- 1 Warn low torque/speed
- 2 Warn high torque/speed
- 3 Warn high/low torque/speed
- 4 Trip low torque/speed
- 5 Trip high torque/speed
- 6 Trip high/low torque/speed

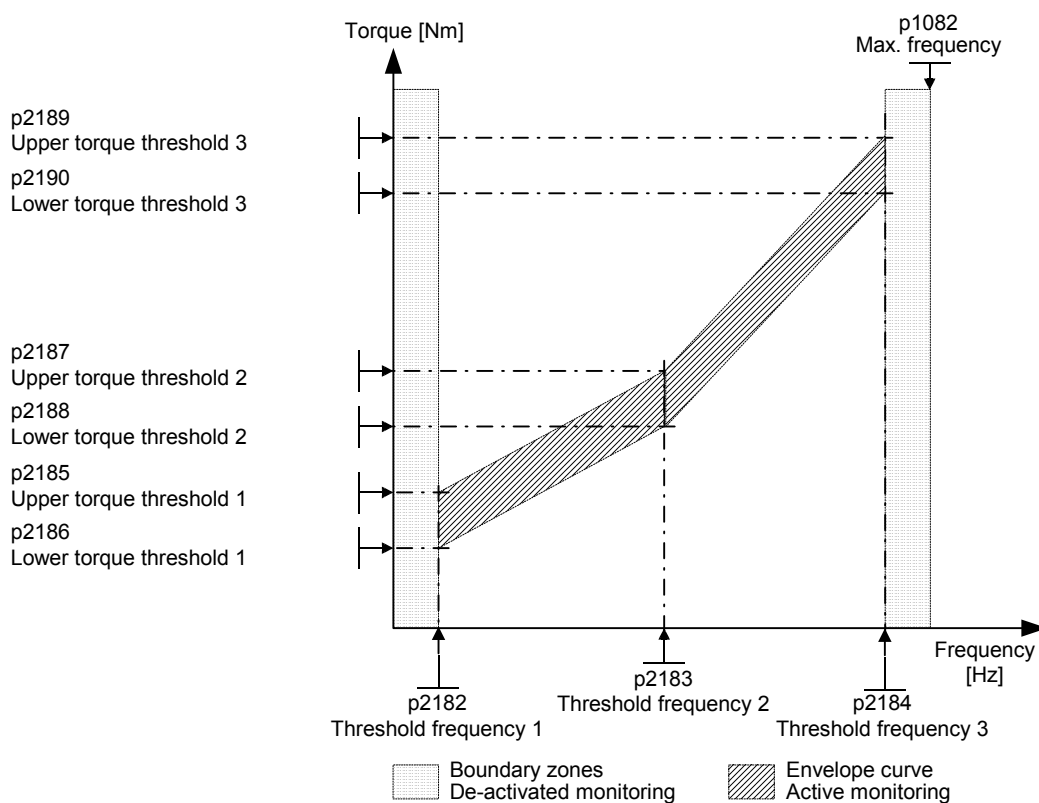
Index:

- P2181[0] : 1st. Drive data set (DDS)
- P2181[1] : 2nd. Drive data set (DDS)
- P2181[2] : 3rd. Drive data set (DDS)

P2182[3]	Belt threshold frequency 1				Min: 0.00	Level 3
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 5.00		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 650.00		

Sets a frequency threshold 1 for comparing actual torque to torque the envelope for belt failure detection.

The frequency torque envelope is defined by 9 parameters - 3 are frequency parameters (P2182 - P2184), and the other 6 define the low and high torque limits (P2185 - P2190) for each frequency (see diagram below).



The allowed frequency/torque region is defined by the shaded area.
When the torque falls outside the area shown, a trip or warning occurs (see parameter P2181).

Index:

- P2182[0] : 1st. Drive data set (DDS)
- P2182[1] : 2nd. Drive data set (DDS)
- P2182[2] : 3rd. Drive data set (DDS)

Note:

Below the the threshold in p2182 and above the threshold in p2184, belt failure detection mode is not active. In this case the values for normal operation with the torque limits given in p1521 and p1520 are valid.

P2183[3]	Belt threshold frequency 2				Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 30.00		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 650.00		

Sets a threshold F2 for comparing actual torque to torque the envelope for belt failure detection.

Index:

P2183[0] : 1st. Drive data set (DDS)
P2183[1] : 2nd. Drive data set (DDS)
P2183[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2184[3]	Belt threshold frequency 3				Min: 0.00	Level 2
	CStat: CUT	Datatype: Float	Unit: Hz	Def: 50.00		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 650.00		

Sets a threshold F3 for comparing actual torque to torque the envelope for belt failure detection.

Index:

P2184[0] : 1st. Drive data set (DDS)
P2184[1] : 2nd. Drive data set (DDS)
P2184[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2185[3]	Upper torque threshold 1				Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: Nm	Def: 99999.0		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 99999.0		

Upper limit threshold value 1 for comparing actual torque.

Index:

P2185[0] : 1st. Drive data set (DDS)
P2185[1] : 2nd. Drive data set (DDS)
P2185[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2186[3]	Lower torque threshold 1				Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: Nm	Def: 0.0		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 99999.0		

Lower limit threshold value 1 for comparing actual torque.

Index:

P2186[0] : 1st. Drive data set (DDS)
P2186[1] : 2nd. Drive data set (DDS)
P2186[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2187[3]	Upper torque threshold 2				Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: Nm	Def: 99999.0		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 99999.0		

Upper limit threshold value 2 for comparing actual torque.

Index:

P2187[0] : 1st. Drive data set (DDS)
P2187[1] : 2nd. Drive data set (DDS)
P2187[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2188[3]	Lower torque threshold 2				Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: Nm	Def: 0.0		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 99999.0		

Lower limit threshold value 2 for comparing actual torque.

Index:

P2188[0] : 1st. Drive data set (DDS)
P2188[1] : 2nd. Drive data set (DDS)
P2188[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2189[3]	Upper torque threshold 3				Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: Nm	Def: 99999.0		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 99999.0		

Upper limit threshold value 3 for comparing actual torque.

Index:

P2189[0] : 1st. Drive data set (DDS)
P2189[1] : 2nd. Drive data set (DDS)
P2189[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2190[3]	Lower torque threshold 3				Min: 0.0	Level 2
	CStat: CUT	Datatype: Float	Unit: Nm	Def: 0.0		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 99999.0		

Lower limit threshold value 3 for comparing actual torque.

Index:

P2190[0] : 1st. Drive data set (DDS)
P2190[1] : 2nd. Drive data set (DDS)
P2190[2] : 3rd. Drive data set (DDS)

Details:

See P2182 (belt threshold frequency 1).

P2192[3]	Time delay for belt failure				Min: 0	Level 2
	CStat: CUT	Datatype: U16	Unit: s	Def: 10		
	P-Group: ALARM	Active: Immediately	QuickComm.: No	Max: 65		

P2192 defines a delay before warning/trip becomes active.
It is used to eliminate events caused by transient conditions.
It is used for both methods of fault detection.

Index:

P2192[0] : 1st. Drive data set (DDS)
P2192[1] : 2nd. Drive data set (DDS)
P2192[2] : 3rd. Drive data set (DDS)

r2197	CO/BO: Monitoring word 1	Datatype: U16	Unit: -	Min: -	Level 2
	P-Group: ALARM			Def: - Max: -	

Monitoring word 1 which indicates the state of monitor functions.
Each bit represents one monitor function.

Bitfields:

Bit00	f_act > P1080 (f_min)	0	No	1	Yes
Bit01	f_act <= P2155 (f_1)	0	No	1	Yes
Bit02	f_act > P2155 (f_1)	0	No	1	Yes
Bit03	f_act > zero	0	No	1	Yes
Bit04	f_act >= setp. (f_set)	0	No	1	Yes
Bit05	f_act > P2167 (f_off)	0	No	1	Yes
Bit06	f_act >= P1082 (f_max)	0	No	1	Yes
Bit07	f_act == setp. (f_set)	0	No	1	Yes
Bit08	Act. current r0068 <= P2170	0	No	1	Yes
Bit09	Act. unfilt. Vdc < P2172	0	No	1	Yes
Bit10	Act. unfilt. Vdc > P2172	0	No	1	Yes
Bit11	Load missing	0	No	1	Yes

r2198	CO/BO: Monitoring word 2	Datatype: U16	Unit: -	Min: -	Level 2
	P-Group: ALARM			Def: - Max: -	

Monitoring word 2 which indicates the state of monitor functions.
Each bit represents one monitor function.

Bitfields:

Bit00	f_act <= P2157 (f_2)	0	No	1	Yes
Bit01	f_act > P2157 (f_2)	0	No	1	Yes
Bit02	f_act <= P2159 (f_3)	0	No	1	Yes
Bit03	f_act > P2159 (f_3)	0	No	1	Yes
Bit04	f_set < P2161	0	No	1	Yes
Bit05	f_set > 0	0	No	1	Yes
Bit06	Motor blocked	0	No	1	Yes
Bit07	Motor pulled out	0	No	1	Yes
Bit08	I_act r0068 < P2170	0	No	1	Yes
Bit09	m_act > P2174 & setp reach	0	No	1	Yes
Bit10	m_act > P2174	0	No	1	Yes
Bit11	Belt failure warning	0	No	1	Yes
Bit12	Belt failure trip	0	No	1	Yes

P2480[3]	Position mode			Min: 1	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 1	
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 1	

Sets the mode for positioning mode.

Possible Settings:

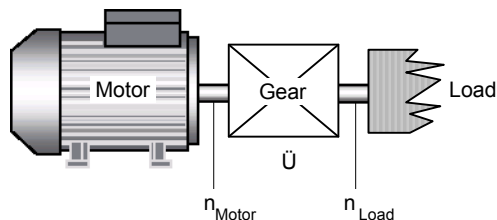
1 Open loop

Index:

P2480[0] : 1st. Drive data set (DDS)
P2480[1] : 2nd. Drive data set (DDS)
P2480[2] : 3rd. Drive data set (DDS)

P2481[3]	Gearbox ratio input	Min: 0.01	Level 3	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: CONTROL	Active: first confirm		QuickComm.: No
		Def: 1.00		
		Max: 9999.99		

Defines the ratio between number of motor shaft revolutions to equal one revolution of the gearbox output shaft.



$$\dot{U} = \frac{\text{Motor revolutions}}{\text{Load revolutions}} = \frac{P2481}{P2482}$$

Index:

- P2481[0] : 1st. Drive data set (DDS)
- P2481[1] : 2nd. Drive data set (DDS)
- P2481[2] : 3rd. Drive data set (DDS)

P2482[3]	Gearbox ratio output	Min: 0.01	Level 3	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: CONTROL	Active: first confirm		QuickComm.: No
		Def: 1.00		
		Max: 9999.99		

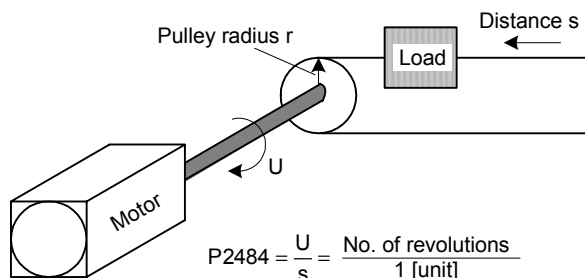
Defines the ratio between number of motor shaft revolutions to equal one revolution of the gearbox output shaft.

Index:

- P2482[0] : 1st. Drive data set (DDS)
- P2482[1] : 2nd. Drive data set (DDS)
- P2482[2] : 3rd. Drive data set (DDS)

P2484[3]	No. of shaft turns = 1 Unit	Min: 0.01	Level 3	
	CStat: CUT	Datatype: Float		Unit: -
	P-Group: CONTROL	Active: first confirm		QuickComm.: No
		Def: 1.00		
		Max: 9999.99		

Sets the number of rotations of the motor shaft required to represent 1 unit of user selected units.



$$P2484 = \frac{U}{s} = \frac{\text{No. of revolutions}}{1 \text{ [unit]}}$$

The following equation determines the number of motor shaft revolutions to stop:

$$\text{Revolutions}_{\text{Motor}} = P2488 \cdot P2484 \cdot \frac{P2481}{P2482}$$

Index:

- P2484[0] : 1st. Drive data set (DDS)
- P2484[1] : 2nd. Drive data set (DDS)
- P2484[2] : 3rd. Drive data set (DDS)

P2487[3]	Positional error trim value			Min: -200.00	Level 3
	CStat: CUT	Datatype: Float	Unit: -	Def: 0.00	
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 200.00	

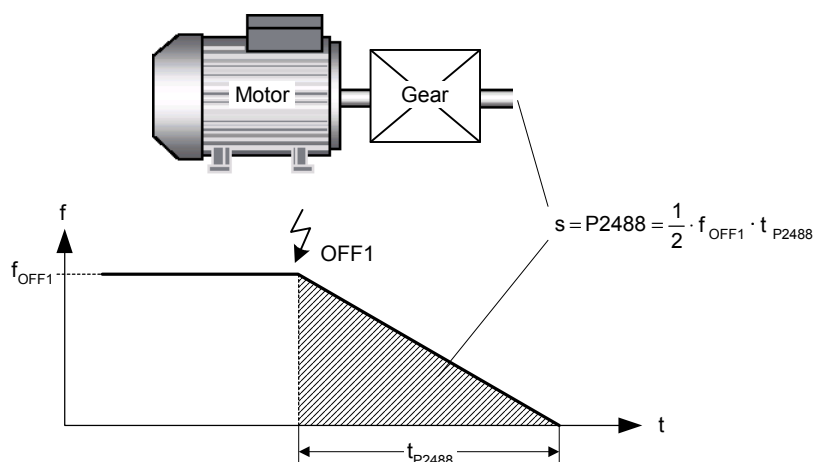
Offset error correction due to mechanical errors.
 Negative value entered when final position is before required end point.
 Positive value entered when final position is after the required end point.

Index:

P2487[0] : 1st. Drive data set (DDS)
 P2487[1] : 2nd. Drive data set (DDS)
 P2487[2] : 3rd. Drive data set (DDS)

P2488[3]	Distance / No. of revolutions			Min: 0.01	Level 3
	CStat: CUT	Datatype: Float	Unit: -	Def: 1.00	
	P-Group: CONTROL	Active: first confirm	QuickComm.: No	Max: 9999.99	

Sets the required distance or number of revolutions (see P2484).

**Index:**

P2488[0] : 1st. Drive data set (DDS)
 P2488[1] : 2nd. Drive data set (DDS)
 P2488[2] : 3rd. Drive data set (DDS)

r2489	Act. number of shaft revolutions			Min: -	Level 3
	CStat: CUT	Datatype: Float	Unit: -	Def: -	
	P-Group: CONTROL			Max: -	

Displays the actual number of shaft revolutions since trigger of positioning.

P2800	Enable FFBs			Min: 0	Level 3
	CStat: CUT	Datatype: U16	Unit: -	Def: 0	
	P-Group: TECH	Active: first confirm	QuickComm.: No	Max: 1	

Free function blocks (FFB) are enabled in two steps.

1. Parameter P2800 enables all free function blocks, normally (P2800 = 1).
2. Parameters P2801 and P2802 respectively, enable each free function block individually (P2801[x] > 0 or P2802[x] > 0).

Possible Settings:

0 Disable
 1 Enable

Dependency:

All active function blocks will be calculated in every 132 ms.

P2801[17]	Activate FFBs	Datatype: U16	Unit: -	Min: 0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0	
	P-Group: TECH			Max: 3	

Free function blocks (FFB) are enabled in two steps.

- Parameter P2800 enables all free function blocks , normally (P2800 = 1).
- Parameters P2801 and P2802 respectively, enable each free function block individually (P2801[x] > 0 or P2802[x] > 0).

In addition, Parameters P2801 and P2802 determine the chronological order of each function block. The following table shows that the priority increases from left to right and from bottom to top.

		← Priority 2 low																										high																																			
Level 3																														↑ Priority 1																																	
Level 2																															↑																																
Level 1																															↑																																
Inactive 0																															↓ low																																
		p2802 [13]	CMP 2	p2802 [12]	CMP 1	p2802 [11]	DIV 2	p2802 [10]	DIV 1	p2802 [9]	MUL 2	p2802 [8]	MUL 1	p2802 [7]	SUB 2	p2802 [6]	SUB 1	p2802 [5]	ADD 2	p2802 [4]	ADD 1	p2802 [3]	Timer 4	p2802 [2]	Timer 3	p2802 [1]	Timer 2	p2802 [0]	Timer 1	p2801 [16]	RS-FF 3	p2801 [15]	RS-FF 2	p2801 [14]	RS-FF 1	p2801 [13]	D-FF 2	p2801 [12]	D-FF 1	p2801 [11]	NOT 3	p2801 [10]	NOT 2	p2801 [9]	NOT 1	p2801 [8]	XOR 3	p2801 [7]	XOR 2	p2801 [6]	XOR 1	p2801 [5]	OR 3	p2801 [4]	OR 2	p2801 [3]	OR 1	p2801 [2]	AND 3	p2801 [1]	AND 2	p2801 [0]	AND 1

Possible Settings:

- 0 Not Active
- 1 Level 1
- 2 Level 2
- 3 Level 3

Index:

- P2801[0] : Enable AND 1
- P2801[1] : Enable AND 2
- P2801[2] : Enable AND 3
- P2801[3] : Enable OR 1
- P2801[4] : Enable OR 2
- P2801[5] : Enable OR 3
- P2801[6] : Enable XOR 1
- P2801[7] : Enable XOR 2
- P2801[8] : Enable XOR 3
- P2801[9] : Enable NOT 1
- P2801[10] : Enable NOT 2
- P2801[11] : Enable NOT 3
- P2801[12] : Enable D-FF 1
- P2801[13] : Enable D-FF 2
- P2801[14] : Enable RS-FF 1
- P2801[15] : Enable RS-FF 2
- P2801[16] : Enable RS-FF 3

Example:

P2801[3] = 2, P2801[4] = 2, P2802[3] = 3, P2802[4] = 2
 FFBs will be calculated in following order:
 P2802[3], P2801[3], P2801[4], P2802[4]

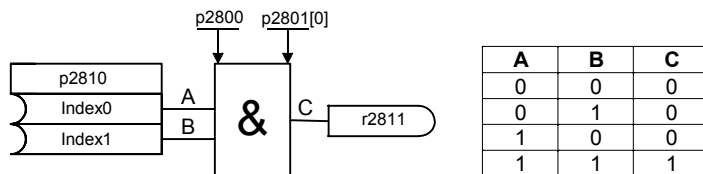
Dependency:

Set P2800 to 1 to enable function blocks.

All active function blocks will be calculated in every 132 ms.

P2810[2]	BI: AND 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2810[0], P2810[1] define inputs of AND 1 element, output is r2811.



Index:

P2810[0] : Binector input 0 (BI 0)
 P2810[1] : Binector input 1 (BI 1)

Dependency:

P2801[0] is active level for the AND element.

r2811	BO: AND 1	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Output of AND 1 element.
 Displays and logic of bits defined in P2810[0], P2810[1].

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[0] is active level for the AND element.

P2812[2]	BI: AND 2	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2812[0], P2812[1] define inputs of AND 2 element, output is r2813.

Index:

P2812[0] : Binector input 0 (BI 0)
 P2812[1] : Binector input 1 (BI 1)

Dependency:

P2801[1] is active level for the AND element.

r2813	BO: AND 2	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Output of AND 2 element.
 Displays and logic of bits defined in P2812[0], P2812[1].

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[1] is active level for the AND element.

P2814[2]	BI: AND 3	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2814[0], P2814[1] define inputs of AND 3 element, output is r2815.

Index:

P2814[0] : Binector input 0 (BI 0)
 P2814[1] : Binector input 1 (BI 1)

Dependency:

P2801[2] is active level for the AND element.

r2815	BO: AND 3	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
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P-Group: TECH

Output of AND 3 element.
Displays and logic of bits defined in P2814[0], P2814[1].

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[2] is active level for the AND element.

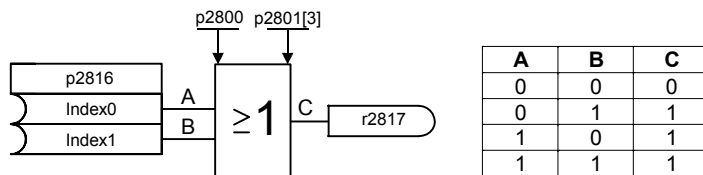
P2816[2]	BI: OR 1	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
-----------------	-----------------	----------------------	----------------	---	--------------------------

CStat: CUT
P-Group: TECH

Active: first confirm

QuickComm.: No

P2816[0], P2816[1] define inputs of OR 1 element, output is r2817.



Index:

P2816[0] : Binector input 0 (BI 0)
P2816[1] : Binector input 1 (BI 1)

Dependency:

P2801[3] is active level for the OR element.

r2817	BO: OR 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
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P-Group: TECH

Output of OR 1 element.
Displays or logic of bits defined in P2816[0], P2816[1].

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[3] is active level for the OR element.

P2818[2]	BI: OR 2	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
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CStat: CUT
P-Group: TECH

Active: first confirm

QuickComm.: No

P2818[0], P2818[1] define inputs of OR 2 element, output is r2819.

Index:

P2818[0] : Binector input 0 (BI 0)
P2818[1] : Binector input 1 (BI 1)

Dependency:

P2801[4] is active level for the OR element.

r2819	BO: OR 2	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
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P-Group: TECH

Output of OR 2 element.
Displays or logic of bits defined in P2818[0], P2818[1].

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[4] is active level for the OR element.

P2820[2]	BI: OR 3	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2820[0], P2820[1] define inputs of OR 3 element, output is r2821.

Index:

P2820[0] : Binector input 0 (BI 0)
P2820[1] : Binector input 1 (BI 1)

Dependency:

P2801[5] is active level for the OR element.

r2821	BO: OR 3	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Output of OR 3 element.

Displays or logic of bits defined in P2820[0], P2820[1].

Bitfields:

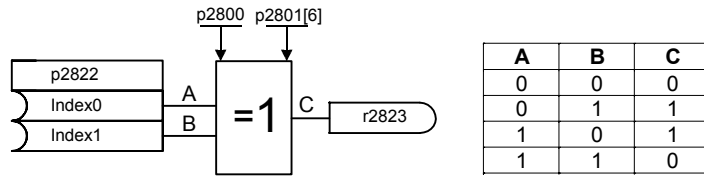
Bit00	Output of BO	0	No	1	Yes
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Dependency:

P2801[5] is active level for the OR element.

P2822[2]	BI: XOR 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2822[0], P2822[1] define inputs of XOR 1 element, output is r2823.



Index:

P2822[0] : Binector input 0 (BI 0)
P2822[1] : Binector input 1 (BI 1)

Dependency:

P2801[6] is active level for the XOR element.

r2823	BO: XOR 1	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Output of XOR 1 element.

Displays exclusive-or logic of bits defined in P2822[0], P2822[1].

Bitfields:

Bit00	Output of BO	0	No	1	Yes
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Dependency:

P2801[6] is active level for the XOR element.

P2824[2]	BI: XOR 2	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2824[0], P2824[1] define inputs of XOR 2 element, output is r2825.

Index:

P2824[0] : Binector input 0 (BI 0)
P2824[1] : Binector input 1 (BI 1)

Dependency:

P2801[7] is active level for the XOR element.

r2825	BO: XOR 2	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				

Output of XOR 2 element.
Displays exclusive-or logic of bits defined in P2824[0], P2824[1].

Bitfields:
Bit00 Output of BO 0 No 1 Yes

Dependency:
P2801[7] is active level for the XOR element.

P2826[2]	BI: XOR 3	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: TECH				

P2826[0], P2826[1] define inputs of XOR 3 element, output is r2827.

Index:
P2826[0] : Binector input 0 (BI 0)
P2826[1] : Binector input 1 (BI 1)

Dependency:
P2801[8] is active level for the XOR element.

r2827	BO: XOR 3	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				

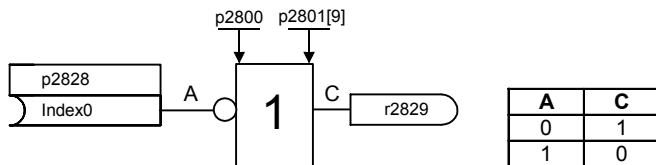
Output of XOR 3 element.
Displays exclusive-or logic of bits defined in P2826[0], P2826[1].

Bitfields:
Bit00 Output of BO 0 No 1 Yes

Dependency:
P2801[8] is active level for the XOR element.

P2828	BI: NOT 1	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: TECH				

P2828 defines input of NOT 1 element, output is r2829.



Dependency:
P2801[9] is active level for the NOT element.

r2829	BO: NOT 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				

Output of NOT 1 element.
Displays not logic of bit defined in P2828.

Bitfields:
Bit00 Output of BO 0 No 1 Yes

Dependency:
P2801[9] is active level for the NOT element.

P2830	BI: NOT 2	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: TECH				

P2830 defines input of NOT 2 element, output is r2831.

Dependency:
P2801[10] is active level for the NOT element.

r2831	BO: NOT 2	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: - Max: -	

Output of NOT 2 element.
Displays not logic of bit defined in P2830.

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[10] is active level for the NOT element.

P2832	BI: NOT 3	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2832 defines input of NOT 3 element, output is r2833.

Dependency:

P2801[11] is active level for the NOT element.

r2833	BO: NOT 3	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: - Max: -	

Output of NOT 3 element.
Displays not logic of bit defined in P2832.

Bitfields:

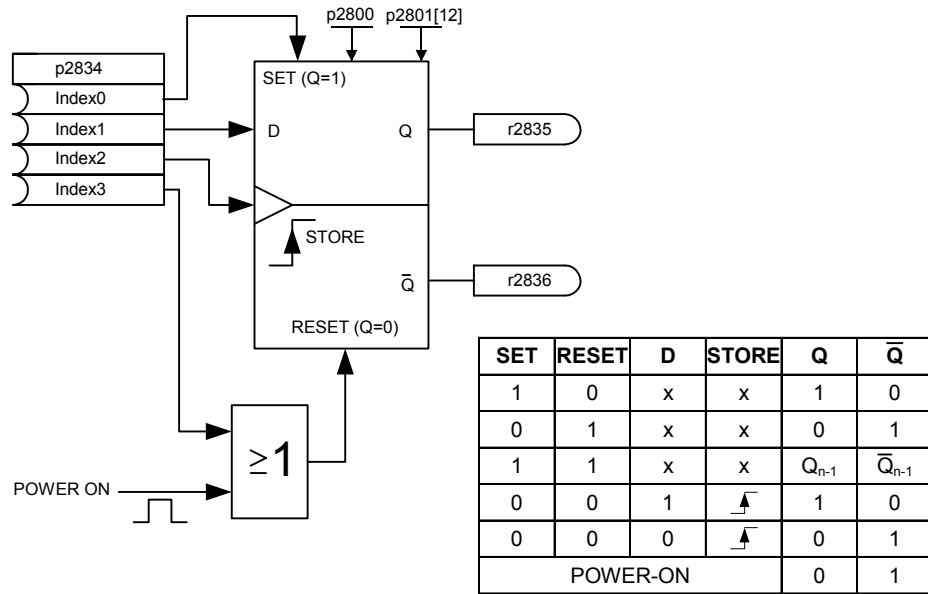
Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[11] is active level for the NOT element.

P2834[4]	BI: D-FF 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2834[0], P2834[1], P2834[2], P2834[3] define inputs of D-FlipFlop 1, outputs are r2835, r2836.



Index:

- P2834[0] : Binector input: Set
- P2834[1] : Binector input: D input
- P2834[2] : Binector input: Store pulse
- P2834[3] : Binector input: Reset

Dependency:

P2801[12] is active level for the D-FlipFlop.

r2835	BO: Q D-FF 1	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Displays output of D-FlipFlop 1, inputs are defined in P2834[0], P2834[1], P2834[2], P2834[3]

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[12] is active level for the D-FlipFlop.

r2836	BO: NOT-Q D-FF 1	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Displays Not-output of D-FlipFlop 1, inputs are defined in P2834[0], P2834[1], P2834[2], P2834[3]

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[12] is active level for the D-FlipFlop.

P2837[4]	BI: D-FF 2	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2837[0], P2837[1], P2837[2], P2837[3] define inputs of D-FlipFlop 2, outputs are r2838, r2839.

Index:

- P2837[0] : Binector input: Set
- P2837[1] : Binector input: D input
- P2837[2] : Binector input: Store pulse
- P2837[3] : Binector input: Reset

Dependency:

P2801[13] is active level for the D-FlipFlop.

r2838	BO: Q D-FF 2	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Displays output of D-FlipFlop 2, inputs are defined in P2837[0], P2837[1], P2837[2], P2837[3]

Bitfields:

Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[13] is active level for the D-FlipFlop.

r2839	BO: NOT-Q D-FF 2	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Displays Not-output of D-FlipFlop 2, inputs are defined in P2837[0], P2837[1], P2837[2], P2837[3]

Bitfields:

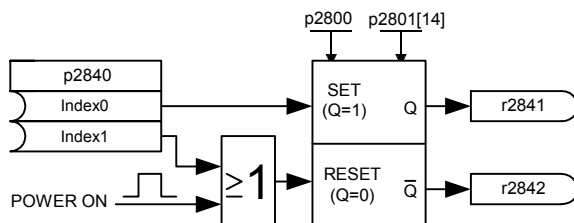
Bit00 Output of BO 0 No 1 Yes

Dependency:

P2801[13] is active level for the D-FlipFlop.

P2840[2]	BI: RS-FF 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

P2840[0], P2840[1] define inputs of RS-FlipFlop 1, outputs are r2841, r2842.



SET	RESET	Q	\bar{Q}
0	0	Q_{n-1}	\bar{Q}_{n-1}
0	1	0	1
1	0	1	0
1	1	Q_{n-1}	\bar{Q}_{n-1}
POWER-ON	0	0	1

Index:

- P2840[0] : Binector input: Set
- P2840[1] : Binector input: Reset

Dependency:

P2801[14] is active level for the RS-FlipFlop.

r2841	BO: Q RS-FF 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				
	Displays output of RS-FlipFlop 1, inputs are defined in P2840[0], P2840[1]				
	Bitfields:				
	Bit00	Output of BO	0	No	1 Yes
	Dependency:				
	P2801[14] is active level for the RS-FlipFlop.				
r2842	BO: NOT-Q RS-FF 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				
	Displays Not-output of RS-FlipFlop 1, inputs are defined in P2840[0], P2840[1]				
	Bitfields:				
	Bit00	Output of BO	0	No	1 Yes
	Dependency:				
	P2801[14] is active level for the RS-FlipFlop.				
P2843[2]	BI: RS-FF 2	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: TECH				
	P2843[0], P2843[1] define inputs of RS-FlipFlop 2, outputs are r2844, r2845.				
	Index:				
	P2843[0] : Binector input: Set				
	P2843[1] : Binector input: Reset				
	Dependency:				
	P2801[15] is active level for the RS-FlipFlop.				
r2844	BO: Q RS-FF 2	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				
	Displays output of RS-FlipFlop 2, inputs are defined in P2843[0], P2843[1]				
	Bitfields:				
	Bit00	Output of BO	0	No	1 Yes
	Dependency:				
	P2801[15] is active level for the RS-FlipFlop.				
r2845	BO: NOT-Q RS-FF 2	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				
	Displays Not-output of RS-FlipFlop 2, inputs are defined in P2843[0], P2843[1]				
	Bitfields:				
	Bit00	Output of BO	0	No	1 Yes
	Dependency:				
	P2801[15] is active level for the RS-FlipFlop.				
P2846[2]	BI: RS-FF 3	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: TECH				
	P2846[0], P2846[1] define inputs of RS-FlipFlop 3, outputs are r2847, r2848.				
	Index:				
	P2846[0] : Binector input: Set				
	P2846[1] : Binector input: Reset				
	Dependency:				
	P2801[16] is active level for the RS-FlipFlop.				

r2847	BO: Q RS-FF 3	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	

Displays output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]

Bitfields:

Bit00 Output of B0 0 No 1 Yes

Dependency:

P2801[16] is active level for the RS-FlipFlop.

r2848	BO: NOT-Q RS-FF 3	Datatype: U16	Unit: -	Min: -	Level 3
	P-Group: TECH			Def: -	

Displays Not-output of RS-FlipFlop 3, inputs are defined in P2846[0], P2846[1]

Bitfields:

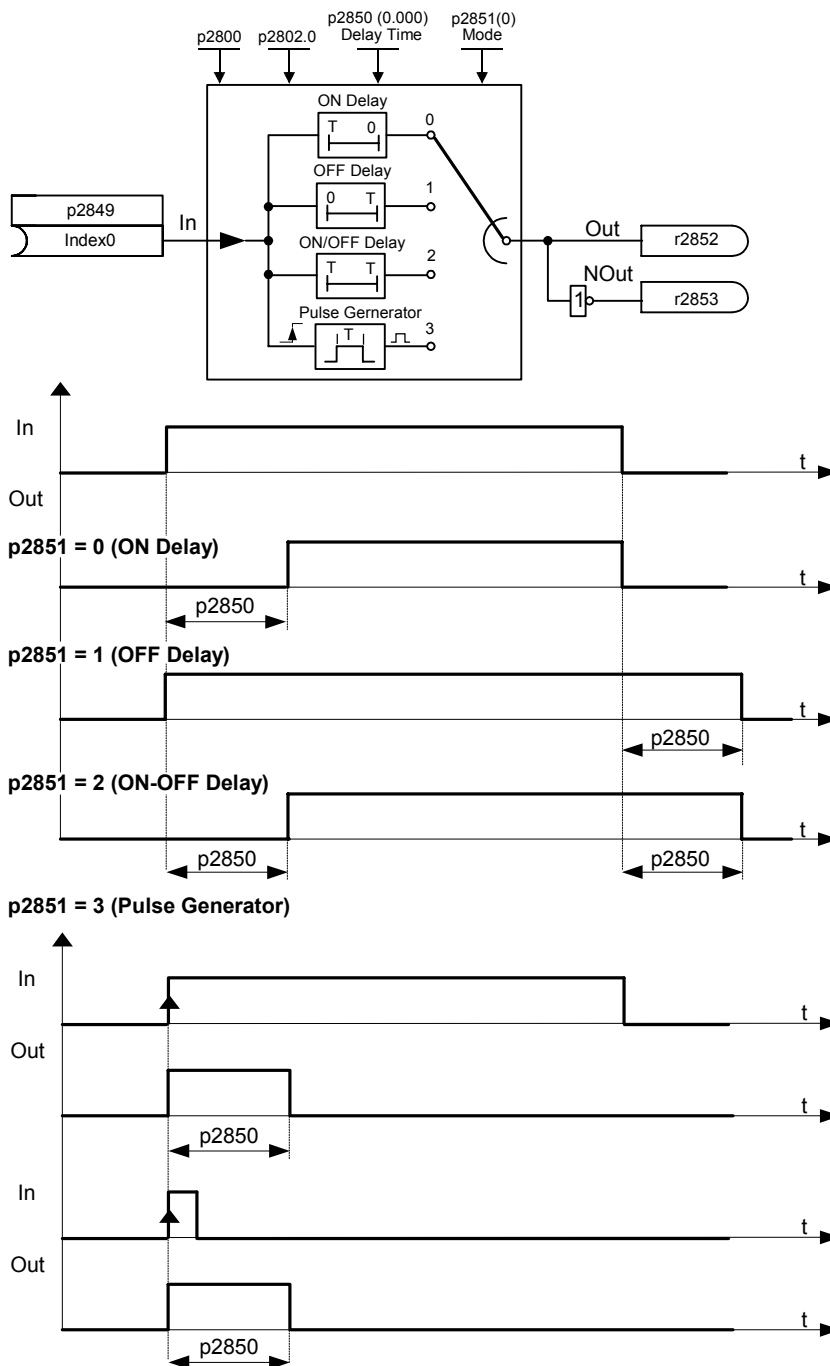
Bit00 Output of B0 0 No 1 Yes

Dependency:

P2801[16] is active level for the RS-FlipFlop.

P2849	BI: Timer 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

Define input signal of timer 1.
P2849, P2850, P2851 are the inputs of the timer, outputs are r2852, r2853.



Dependency:
P2802[0] is active level for the timer.

P2850	Delay time of timer 1	CStat: CUT	Datatype: Float	Unit: s	Min: 0.0	Level 3
		P-Group: TECH	Active: first confirm	QuickComm.: No	Def: 0.0 Max: 6000.0	
Defines delay time of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are r2852, r2853. Dependency: P2802[0] is active level for the timer.						
P2851	Mode timer 1	CStat: CUT	Datatype: U16	Unit: -	Min: 0	Level 3
		P-Group: TECH	Active: first confirm	QuickComm.: No	Def: 0 Max: 3	
Selects mode of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are r2852, r2853. Possible Settings: 0 ON delay 1 OFF delay 2 ON/OFF delay 3 Pulse generator Dependency: P2802[0] is active level for the timer.						
r2852	BO: Timer 1		Datatype: U16	Unit: -	Min: -	Level 3
		P-Group: TECH			Def: - Max: -	
Displays output of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are r2852, r2853. Bitfields: Bit00 Output of BO 0 No 1 Yes Dependency: P2802[0] is active level for the timer.						
r2853	BO: Nout timer 1		Datatype: U16	Unit: -	Min: -	Level 3
		P-Group: TECH			Def: - Max: -	
Displays Not-output of timer 1. P2849, P2850, P2851 are the inputs of the timer, outputs are r2852, r2853. Bitfields: Bit00 Output of BO 0 No 1 Yes Dependency: P2802[0] is active level for the timer.						
P2854	BI: Timer 2	CStat: CUT	Datatype: U32	Unit: -	Min: 0:0	Level 3
		P-Group: TECH	Active: first confirm	QuickComm.: No	Def: 0:0 Max: 40000:0	
Define input signal of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are r2857, r2858. Dependency: P2802[1] is active level for the timer.						
P2855	Delay time of timer 2	CStat: CUT	Datatype: Float	Unit: s	Min: 0.0	Level 3
		P-Group: TECH	Active: first confirm	QuickComm.: No	Def: 0.0 Max: 6000.0	
Defines delay time of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are r2857, r2858. Dependency: P2802[1] is active level for the timer.						

P2856	Mode timer 2	CStat: CUT P-Group: TECH	Datatype: U16 Active: first confirm	Unit: - QuickComm.: No	Min: 0 Def: 0 Max: 3	Level 3
<p>Selects mode of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are r2857, r2858.</p> <p>Possible Settings:</p> <p>0 ON delay 1 OFF delay 2 ON/OFF delay 3 Pulse generator</p> <p>Dependency: P2802[1] is active level for the timer.</p>						
r2857	BO: Timer 2	P-Group: TECH	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
<p>Displays output of timer 2. P2854, P2855, P2856 are the inputs of the timer, outputs are r2857, r2858.</p> <p>Bitfields:</p> <p>Bit00 Output of BO 0 No 1 Yes</p> <p>Dependency: P2802[1] is active level for the timer.</p>						
r2858	BO: Nout timer 2	P-Group: TECH	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
<p>Displays Not-output of timer 2 P2854, P2855, P2856 are the inputs of the timer, outputs are r2857, r2858.</p> <p>Bitfields:</p> <p>Bit00 Output of BO 0 No 1 Yes</p> <p>Dependency: P2802[1] is active level for the timer.</p>						
P2859	BI: Timer 3	CStat: CUT P-Group: TECH	Datatype: U32 Active: first confirm	Unit: - QuickComm.: No	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
<p>Define input signal of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are r2862, r2863.</p> <p>Dependency: P2802[2] is active level for the timer.</p>						
P2860	Delay time of timer 3	CStat: CUT P-Group: TECH	Datatype: Float Active: first confirm	Unit: s QuickComm.: No	Min: 0.0 Def: 0.0 Max: 6000.0	Level 3
<p>Defines delay time of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are r2862, r2863.</p> <p>Dependency: P2802[2] is active level for the timer.</p>						
P2861	Mode timer 3	CStat: CUT P-Group: TECH	Datatype: U16 Active: first confirm	Unit: - QuickComm.: No	Min: 0 Def: 0 Max: 3	Level 3
<p>Selects mode of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are r2862, r2863.</p> <p>Possible Settings:</p> <p>0 ON delay 1 OFF delay 2 ON/OFF delay 3 Pulse generator</p> <p>Dependency: P2802[2] is active level for the timer.</p>						

r2862	BO: Timer 3	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				
<p>Displays output of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are r2862, r2863.</p> <p>Bitfields: Bit00 Output of BO 0 No 1 Yes</p> <p>Dependency: P2802[2] is active level for the timer.</p>					
r2863	BO: Nout timer 3	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				
<p>Displays Not-output of timer 3. P2859, P2860, P2861 are the inputs of the timer, outputs are r2862, r2863.</p> <p>Bitfields: Bit00 Output of BO 0 No 1 Yes</p> <p>Dependency: P2802[2] is active level for the timer.</p>					
P2864	BI: Timer 4	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	CStat: CUT P-Group: TECH	Active: first confirm	QuickComm.: No		
<p>Define input signal of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are r2867, r2868.</p> <p>Dependency: P2802[3] is active level for the timer.</p>					
P2865	Delay time of timer 4	Datatype: Float	Unit: s	Min: 0.0 Def: 0.0 Max: 6000.0	Level 3
	CStat: CUT P-Group: TECH	Active: first confirm	QuickComm.: No		
<p>Defines delay time of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are r2867, r2868.</p> <p>Dependency: P2802[3] is active level for the timer.</p>					
P2866	Mode timer 4	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 3	Level 3
	CStat: CUT P-Group: TECH	Active: first confirm	QuickComm.: No		
<p>Selects mode of timer 4. P2864, P2865, P2866 are the inputs of the timer, outputs are r2867, r2868.</p> <p>Possible Settings: 0 ON delay 1 OFF delay 2 ON/OFF delay 3 Pulse generator</p> <p>Dependency: P2802[3] is active level for the timer.</p>					
r2867	BO: Timer 4	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				
<p>Displays output of timer 4. P2864, P2865, P2866 are the inputs of the timer.</p> <p>Bitfields: Bit00 Output of BO 0 No 1 Yes</p> <p>Dependency: P2802[3] is active level for the timer.</p>					

r2868	BO: Nout timer 4	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: TECH				

Displays Not-output of timer 4.
P2864, P2865, P2866 are the inputs of the timer.

Bitfields:

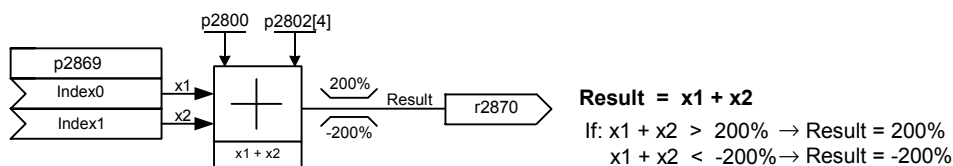
Bit00 Output of BO 0 No 1 Yes

Dependency:

P2802[3] is active level for the timer.

P2869[2]	CI: ADD 1	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: TECH				

Define inputs of Adder 1, result is in r2870.



Index:

P2869[0] : Connector input 0 (CI 0)
P2869[1] : Connector input 1 (CI 1)

Dependency:

P2802[4] is the active level for the Adder.

r2870	CO: ADD 1	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 3
	P-Group: TECH				

Result of Adder 1.

Dependency:

P2802[4] is active level for the Adder.

P2871[2]	CI: ADD 2	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No		
	P-Group: TECH				

Define inputs of Adder 2, result is in r2872.

Index:

P2871[0] : Connector input 0 (CI 0)
P2871[1] : Connector input 1 (CI 1)

Dependency:

P2802[5] is active level for the Adder.

r2872	CO: ADD 2	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 3
	P-Group: TECH				

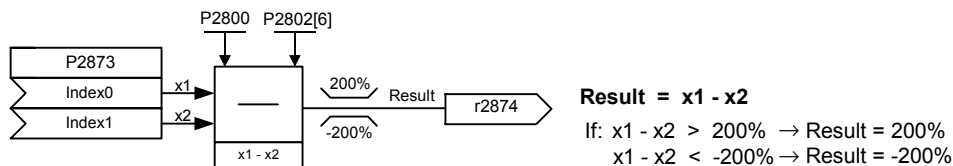
Result of Adder 2.

Dependency:

P2802[5] is active level for the Adder.

P2873[2]	CI: SUB 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

Define inputs of Subtractor 1, result is in r2874.



Index:

P2873[0] : Connector input 0 (CI 0)
 P2873[1] : Connector input 1 (CI 1)

Dependency:

P2802[6] is active level for the Subtractor.

r2874	CO: SUB 1	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

Result of Subtractor 1.

Dependency:

P2802[6] is active level for the Subtractor.

P2875[2]	CI: SUB 2	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

Define inputs of Subtractor 2, result is in r2876.

Index:

P2875[0] : Connector input 0 (CI 0)
 P2875[1] : Connector input 1 (CI 1)

Dependency:

P2802[7] is active level for the Subtractor.

r2876	CO: SUB 2	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: TECH			Def: -	
				Max: -	

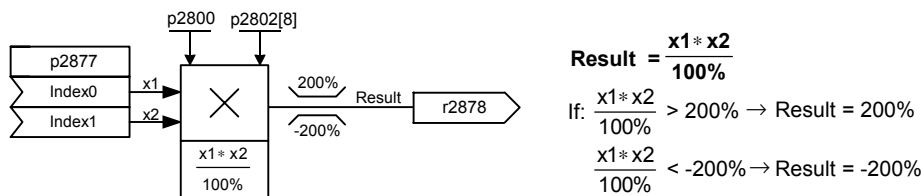
Result of Subtractor 2.

Dependency:

P2802[7] is active level for the Subtractor.

P2877[2]	CI: MUL 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

Define inputs of Multiplier 1, result is in r2878.



Index:

P2877[0] : Connector input 0 (CI 0)
 P2877[1] : Connector input 1 (CI 1)

Dependency:

P2802[8] is active level for the Multiplier.

r2878	CO: MUL 1	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: TECH			Def: - Max: -	

Result of Multiplier 1.

Dependency:

P2802[8] is active level for the Multiplier.

P2879[2]	CI: MUL 2	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

Define inputs of Multiplier 2, result is in r2880.

Index:

P2879[0] : Connector input 0 (CI 0)

P2879[1] : Connector input 1 (CI 1)

Dependency:

P2802[9] is active level for the Multiplier.

r2880	CO: MUL 2	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: TECH			Def: - Max: -	

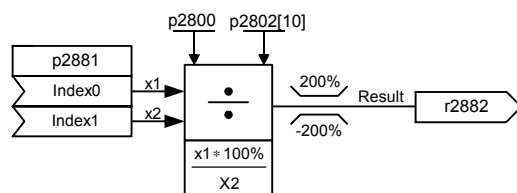
Result of Multiplier 2.

Dependency:

P2802[9] is active level for the Multiplier.

P2881[2]	CI: DIV 1	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

Define inputs of Divider 1, result is in r2882.



$$\text{Result} = \frac{x1 * 100\%}{x2}$$

$$\text{If: } \frac{x1 * 100\%}{x2} > 200\% \rightarrow \text{Result} = 200\%$$

$$\frac{x1 * 100\%}{x2} < -200\% \rightarrow \text{Result} = -200\%$$

Index:

P2881[0] : Connector input 0 (CI 0)

P2881[1] : Connector input 1 (CI 1)

Dependency:

P2802[10] is active level for the Divider.

r2882	CO: DIV 1	Datatype: Float	Unit: %	Min: -	Level 3
	P-Group: TECH			Def: - Max: -	

Result of Divider 1.

Dependency:

P2802[10] is active level for the Divider.

P2883[2]	CI: DIV 2	Datatype: U32	Unit: -	Min: 0:0	Level 3
	CStat: CUT	Active: first confirm	QuickComm.: No	Def: 0:0	
	P-Group: TECH			Max: 40000:0	

Define inputs of Divider 2, result is in r2884.

Index:

P2883[0] : Connector input 0 (CI 0)

P2883[1] : Connector input 1 (CI 1)

Dependency:

P2802[11] is active level for the Divider.

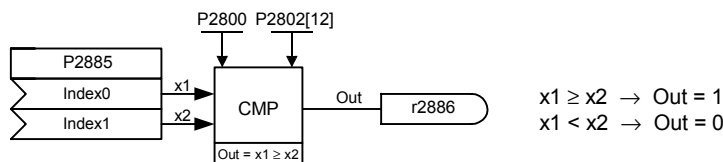
r2884	CO: DIV 2	Datatype: Float	Unit: %	Min: - Def: - Max: -	Level 3
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Result of Divider 2.

Dependency:
P2802[11] is active level for the Divider.

P2885[2]	CI: CMP 1	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
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Defines inputs of Comparator 1, output is r2886.



Index:
P2885[0] : Connector input 0 (CI 0)
P2885[1] : Connector input 1 (CI 1)

Dependency:
P2802[12] is active level for the Comparator.

r2886	BO: CMP 1	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
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Displays result bit of Comparator 1.

Bitfields:
Bit00 Output of BO 0 No 1 Yes

Dependency:
P2802[12] is active level for the Comparator.

P2887[2]	CI: CMP 2	Datatype: U32	Unit: -	Min: 0:0 Def: 0:0 Max: 40000:0	Level 3
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Defines inputs of Comparator 2, output is r2888.

Index:
P2887[0] : Connector input 0 (CI 0)
P2887[1] : Connector input 1 (CI 1)

Dependency:
P2802[13] is active level for the Comparator.

r2888	BO: CMP 2	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
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Displays result bit of Comparator 2.

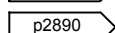
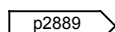
Bitfields:
Bit00 Output of BO 0 No 1 Yes

Dependency:
P2802[13] is active level for the Comparator.

P2889	CO: Fixed setpoint 1 in [%]	Datatype: Float	Unit: %	Min: -200.00 Def: 0.00 Max: 200.00	Level 3
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Fixed percent setting 1.

Connector Setting in %



Range : -200% ... 200%

P2890	CO: Fixed setpoint 2 in [%]				Level 3
	CStat: CUT	Datatype: Float	Unit: %	Min: -200.00	
	P-Group: TECH	Active: first confirm	QuickComm.: No	Def: 0.00 Max: 200.00	

Fixed percent setting 2.

P3900	End of quick commissioning				Level 1
	CStat: C	Datatype: U16	Unit: -	Min: 0	
	P-Group: QUICK	Active: first confirm	QuickComm.: Yes	Def: 0 Max: 11	

Performs calculations necessary for optimized motor operation.

After completion of calculation, P3900 and P0010 (parameter groups for commissioning) are automatically reset to their original value 0.

Possible Settings:

- 0 No quick commissioning
- 1 Quick commis. & factory reset
- 2 Quick commissioning
- 3 Quick commis. : motor data only
- 10 Accept safety changes (only ICU24F)
- 11 Cancel safety changes (only ICU24F)

Dependency:

Changeable only when P0010 > 0.

Details:

P3900 = 1 :

When setting 1 is selected, only the parameter settings carried out via the commissioning menu "Quick commissioning", are retained; all other parameter changes, including the I/O settings, are lost. Motor calculations are also performed.

P3900 = 2 :

When setting 2 is selected, only those parameters, which depend on the parameters in the commissioning menu "Quick commissioning" (P0010 = 1) are calculated. The I/O settings are also reset to default and the motor calculations performed.

P3900 = 3 :

When setting 3 is selected, only the motor and controller calculations are performed. Exiting quick commissioning with this setting saves time (for example, if only motor rating plate data have been changed). Calculates a variety of motor parameters, overwriting previous values. These include P0344 (motor weight), P0350 (demagnetization time), P2000 (reference frequency), P2002 (reference current).

P3900 = 10 (on ICU24F only)

Finishes the safety commissioning by accepting the safety changes.

P3900 = 11 (on ICU24F only)

Finishes the safety commissioning by discarding the safety changes. The safety settings that were active before the safety commissioning are reloaded.

Note:

When transferring parameter p3900, ET 200S FC uses its processor to carry-out internal calculations. Communications - both via USS as well as via the Fieldbus - are interrupted for the time that it takes to make these calculations.

This can result in the following error messages at the connected SIMATIC S7 control (communications via fieldbus):

- Parameter fault 30
- Drive fault 70
- Drive fault 75

When using STARTER (USS) to commission the drive system, data cannot be entered while these calculations are being made.

The faults can be acknowledged as soon as the calculations have been completed in the frequency inverter. These calculations can take up to one minute to complete.

P3950	Access of hidden parameters				Level 4
	CStat: CUT	Datatype: U16	Unit: -	Min: 0	
	P-Group: ALWAYS	Active: first confirm	QuickComm.: No	Def: 0 Max: 255	

Accesses special parameters for development (expert only) and factory functionality (calibration parameter).

r3954[13]	CM info and GUI ID	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 4
	P-Group: -				

Used to classify firmware (only for SIEMENS internal purposes).

Index:

- P3954[0] : CM label (inc./branch)
- P3954[1] : CM label (counter)
- P3954[2] : CM label
- P3954[3] : GUI ID
- P3954[4] : GUI ID
- P3954[5] : GUI ID
- P3954[6] : GUI ID
- P3954[7] : GUI ID
- P3954[8] : GUI ID
- P3954[9] : GUI ID
- P3954[10] : GUI ID
- P3954[11] : GUI ID major release
- P3954[12] : GUI ID minor release

r3978	BICO counter	Datatype: U32	Unit: -	Min: - Def: - Max: -	Level 4
	P-Group: -				

Counts the number of changed BICO links

P3980	Commissioning command selection	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 66	Level 4
	CStat: T P-Group: -	Active: first confirm	QuickComm.: No		

Toggles command and setpoint sources between freely programmable BICO parameters and fixed command/setpoint profiles for commissioning.

The command and setpoint sources can be changed independently.

The tens digit selects the command source, the ones digit the setpoint source.

Possible Settings:

- 0 Cmd=BICO param. Setp=BICO param.
- 4 Cmd=BICO param. Setp=USS on RS232
- 6 Cmd=BICO param. Setp=Fieldbus
- 40 Cmd=USS on RS232 Setp=BICO param.
- 44 Cmd=USS on RS232 Setp=USS on RS232
- 46 Cmd=USS on RS232 Setp=Fieldbus
- 60 Cmd=Fieldbus Setp=BICO param.
- 64 Cmd=Fieldbus Setp=USS on RS232
- 66 Cmd=Fieldbus Setp=Fieldbus

P3981	Reset active fault	Datatype: U16	Unit: -	Min: 0 Def: 0 Max: 1	Level 4
	CStat: CT P-Group: ALARM	Active: first confirm	QuickComm.: No		

Resets active faults when changed from 0 to 1.

Possible Settings:

- 0 No fault reset
- 1 Reset fault

Note:

Automatically reset to 0.

Details:

See P0947 (last fault code)

r3986[2]	Number of parameters	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 4
	P-Group: -				

Number of parameters on the drive

Index:

- P3986[0] : Read only
- P3986[1] : Read & write

P7840	Control Word for Hot Swapping				Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 1		
	P-Group: INVERTER	Active: Immediately	QuickComm.: No	Max: 33		

Defines the behavior of the drive after a Control Unit (CU) or a Power Modul (PM) hot swap. If a hot swap is accepted the drive is allowed to run, otherwise fault F399 will be set. A hot swap is classed as a PM Hotswap, if the PM is swapped, while the CU remains powered up. A hot swap is classed as a CU Hotswap, if the CU is swapped or a change of the PM during power down.

0 = No CU or PM Hotswap allowed.
1 = No CU allowed, PM allowed if MLFB matches previous PM.
2 = No CU allowed, PM allowed if PM Code (Stored at PM) matches previous PM.
3 = No CU allowed, PM is allowed without restriction.
1x = CU allowed only if MLFB matches previous.
2x = CU allowed only if PM Code matches previous.
3x = CU allowed without restriction.

where x is second digit associated with PM restrictions, for example setting 33 is CU and PM without any restrictions, and 30 would be CU without restriction and PM not allowed.

Possible Settings:

0	Fault every HS
1	Run MLFB PM HS
2	Run PSCd PM HS
3	Run any PM HS
10	Run MLFB CU HS
11	Run MLFB CU+PM HS
12	Run MLFB CU/PSCd PM
13	Run MLFB CU/Any PM
20	Run PSCd CU HS
21	Run PSCd CU/MLFB PM
22	Run PSCd CU+PM
23	Run PSCd CU/Any PM
30	Run Any CU HS
31	Run Any CU/MLFB PM
32	Run Any CU/PSCd PM
33	Run any HS

Note:

To allow the drive to run after a CU hot swap, can cause a lot of damage, because there is no check if the parameter set of the new CU and the previous drive match.

P7841[5]	Power Modul serialno for hot sw				Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0		
	P-Group: INVERTER	Active: Immediately	QuickComm.: No	Max: 65535		

Reads the power modul serial number, which is stored in the control unit. At power up these serial number are verified, if any swapping of the CU or the PM had been taken place.

Index:

P7841[0]	: Prod. site
P7841[1]	: Prod. year
P7841[2]	: Prod. month
P7841[3]	: Prod. day
P7841[4]	: Prod. number

Note:

The parameter cannot be changed.

P8450	Para Time out				Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: ms	Def: 500		
	P-Group: COMM	Active: Immediately	QuickComm.: No	Max: 65535		

Maximum wait time in ms before a parameterization fault is signaled to FB100

Details:

The parameter is only read after power cycle on of ICU24/ICU24F.
See also ET 200S FC Manual "Commissioning and Operation", and "Connection to SIMATIC S7".

P8451	Cycl Time out				Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: ms	Def: 300		
	P-Group: COMM	Active: Immediately	QuickComm.: No	Max: 65535		

Maximum wait time in ms in order to recognize a communication fault between ICU24(F) and FB100

Details:

The parameter is only read after power cycle on of ICU24/ICU24(F).
See also ET 200S FC Manual "Commissioning and Operation", and "Connection to SIMATIC S7".

P8452	Dia Lock			Min: 0	Level 3
	CStat: CT	Datatype: U16	Unit: -	Def: 0	
	P-Group: COMM	Active: Immediately	QuickComm.: No	Max: 65535	

Disables or enables diagnostic alarm on Simatic S7 / FB100

Bitfields:

Bit00	Diagnosis ON	0	No	1	Yes
Bit01	Para fault ON	0	No	1	Yes

Details:

Bit00

- Group diagnosis OFF 1 YES
- Group diagnosis ON 0 NO

The parameter is only read after power cycle (24 V) on of ICU24/ICU24F.

P8455[2]	SI slot ID			Min: -1	Level 3
	CStat: CT	Datatype: I32	Unit: -	Def: -1	
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max: 65535	

Slot ID stored in the Control Unit. The Slot ID is sent to the drive by the PLC.

The Slot ID is used to prevent the drive accidentally being swapped to a different slot and therefore connected to a different motor.

Index:

P8455[0] : Value from EEPROM
P8455[1] : reserve

Note:

The Slot ID can only be changed if the drive is in a virgin state (P8457 = 1) or the Slot ID still has its default value.

If the Slot ID stored in the Control Unit does not match the Slot Id from the PLC the drive will trip.

Procedure to change drive to a different slot in the ET200S rack with an ICU24 (non Safety control unit):

1. set p8457 = 1
2. select p8455, enter Slot ID

Procedure to change drive to a different slot in the ET200S rack with an ICU24F (Safety control unit):

1. set p0010 = 95, start commissioning mode
2. select p9761 = enter password
3. set p8457 = 1
4. set p3900 = 11, end commissioning mode
5. select p8455, enter Slot ID

P8456[2]	SI EEPROM start identifier			Min: 0	Level 3
	CStat: CT	Datatype: I16	Unit: -	Def: 0	
	P-Group: COMM	Active: first confirm	QuickComm.: No	Max: 5	

PMMC stored in the Control Unit. Determines if an MMC-PS is required and if safety is enabled.

The PPMC is set when configuring the drive in SIMATIC S7 and send via prm telegram to the control unit.

The possible settings are stored in P8456 as follows:

- 0 - MMC-PS isn't necessary
 - Safety is deactivated
- 1 - MMC-PS is necessary
 - Safety is deactivated
- 4 - MMC-PS isn't necessary
 - Safety is activated
- 5 - MMC-PS is necessary
 - Safety is activated

If MMC Card is not required and is present, it will get ignored.

When a MMC card is required it will automatically clone the parameter from the MMC (Clone00.bin) at startup, if this is not possible the drive will trip.

Index:

P8456[0] : Value from EEPROM
P8456[1] : reserve

Note:

The PMMC Parameter can only be changed via the PLC PRM Telegram. If the sent Parameter does not match the stored one the drive will trip.

Procedure to change the PMMC Parameter:

1. Change in the HW Configuration
2. Startup the drive - Drive will trip because the drive still started up with the previous setting (e.g. Cloning was not performed)
3. Power cycle

P8457	Reset SI converter (virgin)	Min: 0	Level
	CStat: CT	Datatype: U16	Unit: -
	P-Group: PAR_RESET	Active: first confirm	QuickComm.: No
		Def: 1	3
		Max: 1	

This parameter specifies whether the converter is reset to new ('virgin') and can therefore accept an MMC-PS from another control module for parameterization.

Note:

If safety is enabled it is necessary to set the safety password to change this parameter.

P9601	SI enable parameter	Min: 0	Level
	CStat: C	Datatype: U16	Unit: -
	P-Group: SAFETY	Active: first confirm	QuickComm.: No
		Def: 1	3
		Max: 3	

Safety parameter for enabling the safety control functions (see r9771).

If the safe standstill (SH) is enabled, the safety group can be selected via safety rails G1 - G5 (see p9603/p9803).

- Bit00 enables/disables all safety functions. If enabled, the ICU24F reacts to commands from the safety rails and checks the consistency of safety software and hardware. Bit00 must be consistent with the configuration in the PLC (see p8456 Bit02).
- Bit01 activates the forced dynamization on selection of the SH safety mode. Bit00 must be set. Warning A1699 can only be acknowledged when forced dynamization has been finished successfully. The switch-off of pulses is inhibited during the test (i.e. r0052 Bit06 = 1) for approximately 2.4 seconds.

Notice:

The switch-off circuitry of the mechanical brake is tested during the forced dynamisation. For short periods (2ms - 16ms) the brake is controlled to open. In general the mechanical brake will require command signals longer than 20ms. Care should be taken if a brake is used that has a reaction time of less than 20ms.

Note:

On non-safety hardware units (ICU24), p9601 is zero by default and cannot be changed.

Parameter p9601 can only be changed on safety hardware units (ICU24F).

P9602	SI enable brake triggering	Min: 0	Level
	CStat: C	Datatype: U16	Unit: -
	P-Group: SAFETY	Active: first confirm	QuickComm.: No
		Def: 1	3
		Max: 1	

Reserved without function.

Possible Settings:

- 0 Safe brake triggering disabled
- 1 Close holding brake with SH

Note:

The holding brake must be dimensioned so that should a fault occur the complete drive can be braked to zero from any possible operational speed. If no holding brake is present, the machine manufacturer must adopt other suitable measures to protect against motion after the energy supply to the motor has been cut (e.g. to protect against sagging loads).

P9603	SI safety group select for SH				Level 3
	CStat: C	Datatype: U16	Unit: -	Min: 1	
	P-Group: SAFETY	Active: first confirm	QuickComm.: No	Def: 1 Max: 5	

Selection of the safety group via a safety multiplexer. Five safety groups are available and the ICU24F must be assigned to one group.

The safety group determines which safety rail is configured to activate the safe standstill (SH). The signal logic of the safety rails is low-active (24V = inactive, 0V = active).

E.g. if safety rail 2 is configured with p9603 = p9803 = 2, the drive will ignore a 0V (low-level) signal on safety rails G1, G3, G4 and G5. Only if safety rail 2 is at 0V (low level), the request for activating the SH is recognised.

If a safety rail is configured but inactive the respective LED is lit. The respective LED flashes, if the safety rail is configured and active (i.e. at 0V). The LED is off if the respective safety rail is not configured.

Note:

Safety rail 6 (G6) is reserved for selecting the safely reduced speed (SG).

For activating the SBR, G6 must first be low before the SH safety rail (that is configured by p9603/p9803) is set low. The delay should be > 16ms.

Details see Operating Instructions.

P9659	SI maximum time until test stop				Level 3
	CStat: C	Datatype: Float	Unit: h	Min: 0.1	
	P-Group: SAFETY	Active: first confirm	QuickComm.: No	Def: 8.0 Max: 8760.0	

The time interval between test stops is specified. The remaining time until a test stop is required is shown in r9660. When r9660 reaches zero, the time interval has expired and warning A1699 is activated. The warning solely informs that a forced dynamisation is required. The user should activate a forced dynamisation on the next occasion. The drive functionality will not be affected by the warning.

The forced dynamisation is activated in the following cases:

- after each power-up,
- on selecting the SH when Bit01 in p9601/p9801 is set,
- when leaving the SH caused due to a drive fault.

During the forced dynamisation the shutdown paths are checked and a processor selftest runs.

The timer for the forced dynamisation (see r9660) is reset to the default value specified in p9659 and warning A1699 is cleared under the following conditions:

- after each power-up,
- on selecting the SH when Bit01 in p9601/p9801 is set and the test is complete,
- when leaving the SH caused due to a drive fault.

The max value of 8760 hours is equivalent to 365 days.

Details see Operating Instructions "Commissioning and Operation".

r9660	CO: SI remaining time until test stop				Level 3
		Datatype: Float	Unit: h	Min: -	
	P-Group: SAFETY			Def: - Max: -	

Parameter r9660 displays the remaining time until a test stop is required. When r9660 reaches zero, warning A1699 is issued and status Bit06 in parameter r9772 is set.

Note:

The warning A1699 and Bit06 of r9772 are only cleared when the dynamisation has been completed (see description of p9659).

The resetting of r9660 to the value in p9659 will take place once the dynamisation has finished.

The resolution of r9660 is 0.1 hour or 6 minutes.

P9680	SI braking ramp delay	Min: 10	Level 3
	CStat: C P-Group: SAFETY	Datatype: U32 Unit: ms Def: 150 Active: first confirm QuickComm.: No Max: 99000	
<p>Time [in ms] between selecting the SBR and the activation of the monitoring ramp. The actual frequency is compared to the frequency of the monitoring ramp when the SBR is active. If the actual frequency exceeds that of the monitoring ramp, an SH (storing) is generated.</p> <p>For applications with changing loads, an increase of p9680/p9880 or p9691/p9891 is recommended. A larger deviation of the actual frequency from the reference is then acceptable.</p> <p>Details see Operating Instructions "Commissioning and Operation".</p>			
Note:			
A value of 99000 deactivates the SBR monitoring. Set p9880 accordingly. The ramping on selection of SG or SBR will however still follow the ramping time in p9681/p9881.			
P9681	SI braking ramp down time	Min: 100	Level 3
	CStat: C P-Group: SAFETY	Datatype: U32 Unit: ms Def: 10000 Active: first confirm QuickComm.: No Max: 99000	
<p>Defines the braking ramp down time for the SBR in seconds. The ramp down time is used for the SBR and the monitoring ramp.</p> <p>The total braking time T_x can be derived where f_x is the current frequency according to the following formulas:</p> <ul style="list-style-type: none"> - For activation of the SG: $T_x = p9681 * (f_x - p9690) / 200\text{Hz}$ - For activation of SBR: $T_x = p9681 * (f_x - p9682) / 200\text{Hz}$ 			
Note:			
In contrast to other ramping times (e.g. p1120, p1121), the safety braking time is referred to 200Hz and not to p1082. See formulas above.			
P9682	SI minimum speed for standstill	Min: 1.0	Level 3
	CStat: C P-Group: SAFETY	Datatype: Float Unit: Hz Def: 5.0 Active: first confirm QuickComm.: No Max: 20.0	
<p>A speed below the threshold of p9682/p9882 is considered standstill.</p> <p>If the SBR has been selected, the safe standstill (SH) will be activated.</p>			
Note:			
Applies only when the safe braking ramp (SBR) is active.			
P9690	SI setpoint for SG	Min: 1.0	Level 3
	CStat: C P-Group: SAFETY	Datatype: Float Unit: Hz Def: 10.0 Active: first confirm QuickComm.: No Max: 300.0	
<p>Speed setpoint that is used when the safely reduced speed (SG) is selected.</p> <p>On activation of safety rail 6 (G6), the frequency is reduced following the SBR (see p9681/p9881) until the frequency of p9690/p9890 is reached.</p> <p>When the SG is active and the frequency defined by the speed threshold p9691/p9891 is exceeded, an SH (storing) is generated.</p> <p>Depending on the setting in p9692/p9892 the frequency of p9790/p9890 may also serve as a speed threshold instead of a setpoint. If the actual speed on selecting the SG is above this threshold, an SH with a drive fault is generated.</p> <p>If the actual speed is below the frequency setpoint of p9690/p9890 and the SG is activated, the actual frequency is maintained and cannot be changed until the SG is deactivated.</p> <p>Once the SBR or the SG are active, the frequency reference from e.g. the PLC (via PROFIBUS DP) or STARTER (via USS) is ignored.</p>			
Note:			
For applications with changing loads, an increase of p9680/p9880 or p9691/p9891 is recommended. If the "safely reduced speed" (SG) is selected, Bit04 and Bit05 will be set simultaneously in r9772. Details see Operating Instructions "Commissioning and Operation".			

P9691	SI tolerance for SG	Datatype: Float	Unit: Hz	Min: 5.0	Level 3
	CStat: C	Active: first confirm	QuickComm.: No	Def: 12.0	
	P-Group: SAFETY			Max: 302.0	

Upper tolerance margin for the SG. If the actual frequency exceeds the value of p9691/p9891 an SH (storing) is generated. The SG needs to be active.

For applications with changing loads it is recommended to increase p9691/p9891.

Note:

The value in p9691 needs to be larger than the value in p9690. This condition is checked when leaving the safety commissioning.

P9692	SI response to selecting SG	Datatype: U16	Unit: -	Min: 0	Level 3
	CStat: C	Active: first confirm	QuickComm.: No	Def: 1	
	P-Group: SAFETY			Max: 1	

Defines the response after the initiation of the safely reduced speed (SG) when the actual speed is higher than the value in p9690.

Possible Settings:

- 0 Initiate SBR+SH with drive fault when $f > f_SG$
- 1 Activate SBR while $f > f_SG$

Note:

The setting will also be relevant when selecting the SBR by switching rail G6 first and the SH rail after a short delay.

r9760	SI internal password	Datatype: U32	Unit: -	Min: -	Level 3
	CStat: C	Active: first confirm	QuickComm.: No	Def: -	
	P-Group: SAFETY			Max: -	

Contains the current safety password. For safety commissioning or safety reset the value of r9760 has to be entered into p9761.

If the password in p9761 is not set correctly to the value in r9760, none of the safety parameters can be written and a fault F1659 is generated.

This parameter is changed automatically to the password in p9763 when the new value of p9762 is identical to the confirmation password in p9763.

P9761	SI input password	Datatype: U32	Unit: -	Min: 1000	Level 3
	CStat: C	Active: first confirm	QuickComm.: No	Def: -	
	P-Group: SAFETY			Max: 99999	

The safety password of r9760 is entered in this parameter to get access to changing the safety parameters. If p9761 is not identical to r9760 a fault F1659 is generated.

P9762	SI change password	Datatype: U32	Unit: -	Min: 1000	Level 3
	CStat: C	Active: first confirm	QuickComm.: No	Def: -	
	P-Group: SAFETY			Max: 99999	

Parameter to change the safety password. The new safety password is entered in p9762 and then confirmed by entering same value in p9763.

P9763	SI change password confirmation	Datatype: U32	Unit: -	Min: 1000	Level 3
	CStat: C	Active: first confirm	QuickComm.: No	Def: -	
	P-Group: SAFETY			Max: 99999	

Confirm a safety password change. Parameter needs to be set to the same value as p9762. Only then then password change of p9762 is stored in r9760 as new password. If p9763 is not identical to p9762, both values are cleared and r9760 is not updated.

Note:

The values in p9762 and p9763 are set to zero automatically when the new password is accepted.

r9770[3]	Firmware SI version	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: SAFETY				
	Displays the SI version. Index 0: Safety major release Index 1: Safety minor release Index 2: Safety baselevel (patch) Example: r9770[0] = 2, r9770[1] = 1, r9770[2] = 3 is for safety version V02.01.03				
	Index: P9770[0] : Safety major release P9770[1] : Safety minor release P9770[2] : Safety baselevel (patch)				
r9771	CO/BO: SI hardware functions	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: SAFETY				
	Displays the available safety functions of the drive (bit coded).				
	Bitfields:				
	Bit00	SH available	0 No	1 Yes	
	Bit01	SG available	0 No	1 Yes	
	Note: If r9771 = 255 or when all unused bits are set, an error has occurred on initialising this parameter.				
r9772	CO/BO: SI status word	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: SAFETY				
	Displays the status of safety integrated.				
	Bitfields:				
	Bit00	Safe standstill (SH) selected	0 No	1 Yes	
	Bit01	Safe standstill (SH) active	0 No	1 Yes	
	Bit02	Safe standstill active, drive fault on P1	0 No	1 Yes	
	Bit03	Safe standstill active, drive fault on P2	0 No	1 Yes	
	Bit04	Safely reduced speed (SG) selected	0 No	1 Yes	
	Bit05	Safely reduced speed (SG) reached	0 No	1 Yes	
	Bit06	Dynamisation required	0 No	1 Yes	
	Bit07	Brake feedback enabled	0 No	1 Yes	
	Bit08	Safe braking ramp (SBR) on	0 No	1 Yes	
	Note: The selection of a safety mode (SH, SBR or SG) is via the safety rails. The SH can be active due to a selection via the safety rails or due to a drive fault. See r0947 and r0949 for more information about the fault. When selecting the SG, the SBR may be on (Bit08) until the SG setpoint speed (see p9690/p9890) is reached.				
r9798	SI display checksum	Datatype: U16	Unit: -	Min: - Def: - Max: -	Level 3
	P-Group: SAFETY				
	Display of safety checksum for P1. The checksum changes when CRC-relevant safety parameters of P1 are changed (parameter range p9600 - p9699, except p9659).				
	Note: This checksum must be identical to the value in r9898 before the safety commissioning can be finished via p3900 = 10. If r9798 differs from r9898 the CRC-relevant safety parameters of P1 differ from that of P2. Check the parameters of P1 against that of P2 and correct the mistake. When r9798 and r9898 differ, the safety commissioning can always be left via p3900 = 11, thus discarding the last changes.				

P9799	SI parameter checksum	CStat: C P-Group: SAFETY	Datatype: U16 Active: first confirm	Unit: - QuickComm.: No	Min: 0 Def: 0 Max: 65535	Level 3
Confirm checksum of the P1 safety parameters. The correct value has to be entered before leaving the safety commissioning with p3900 = 10.						
Only if r9798, r9898, p9799 and p9899 are all identical, the commissioning can be finished.						
Note: Enter the reading of r9798 or r9898 into p9799 once no more safety parameters need to be changed.						
P9801	SI enable parameter	CStat: C P-Group: SAFETY	Datatype: U16 Active: first confirm	Unit: - QuickComm.: No	Min: 0 Def: 1 Max: 3	Level 3
Double of parameter p9601. See there.						
Note: On non-safety hardware units (ICU24), p9801 is zero by default.						
P9802	SI enable brake triggering	CStat: C P-Group: SAFETY	Datatype: U16 Active: first confirm	Unit: - QuickComm.: No	Min: 0 Def: 1 Max: 1	Level 3
Currently unused.						
Possible Settings:						
0 Safe brake triggering disabled						
1 Close holding brake with SH						
P9803	SI safety group select for SH	CStat: C P-Group: SAFETY	Datatype: U16 Active: first confirm	Unit: - QuickComm.: No	Min: 1 Def: 1 Max: 5	Level 3
Double of parameter p9603. See there.						
P9880	SI braking ramp delay	CStat: C P-Group: SAFETY	Datatype: Float Active: first confirm	Unit: s QuickComm.: No	Min: 0.010 Def: 0.150 Max: 99.000	Level 3
Double of parameter p9680. See there.						
Note: The delay time in p9880 is entered in seconds!						
P9881	SI braking ramp down time	CStat: C P-Group: SAFETY	Datatype: Float Active: first confirm	Unit: s QuickComm.: No	Min: 0.100 Def: 10.000 Max: 99.000	Level 3
Double of parameter p9681. See there.						
Note: The ramp down time in p9881 is entered in seconds!						
P9882	SI minimum speed for standstill	CStat: C P-Group: SAFETY	Datatype: Float Active: first confirm	Unit: KHz QuickComm.: No	Min: 0.0010 Def: 0.0050 Max: 0.0200	Level 3
Double of parameter p9682. See there.						
Note: The standstill detection frequency in p9882 is entered in kHz!						
P9890	SI setpoint for SG	CStat: C P-Group: SAFETY	Datatype: Float Active: first confirm	Unit: KHz QuickComm.: No	Min: 0.0010 Def: 0.0100 Max: 0.3000	Level 3
Double of parameter p9690. See there.						
Note: The SG setpoint in p9890 is entered in kHz!						

P9891	SI tolerance for SG				Level 3
	CStat: C	Datatype: Float	Unit: KHz	Min: 0.0050	
	P-Group: SAFETY	Active: first confirm	QuickComm.: No	Def: 0.0120 Max: 0.3020	

Double of parameter p9691. See there.

Note:

The SG tolerance in p9891 is entered in kHz!

P9892	SI response to selecting SG				Level 3
	CStat: C	Datatype: U16	Unit: -	Min: 0 Def: 1	
	P-Group: SAFETY	Active: first confirm	QuickComm.: No	Max: 1	

Double of parameter p9692. See there.

Possible Settings:

- 0 Initiate SBR+SH with drive fault when $f > f_{SG}$
- 1 Activate SBR while $f > f_{SG}$

r9898	SI display checksum				Level 3
	Datatype: U16	Unit: -	Min: -	Def: -	
	P-Group: SAFETY	Max: -			

Display of safety checksum for P2 parameters. The checksum changes when safety parameters for P2 are changed (parameter range p9800 - p9892).

Note:

This checksum must be identical to the value in r9798 before the safety commissioning can be finished via p3900 = 10. If r9898 differs from r9798, the safety parameters on P2 differ from the safety parameters on P1. Check the safety parameters and correct the mistake.

The safety commissioning can always be left via p3900 = 11, thus discarding the last changes.

P9899	SI parameter checksum				Level 3
	CStat: C	Datatype: U16	Unit: -	Min: 0 Def: 0	
	P-Group: SAFETY	Active: first confirm	QuickComm.: No	Max: 65535	















Confirm checksum of the safety parameters.

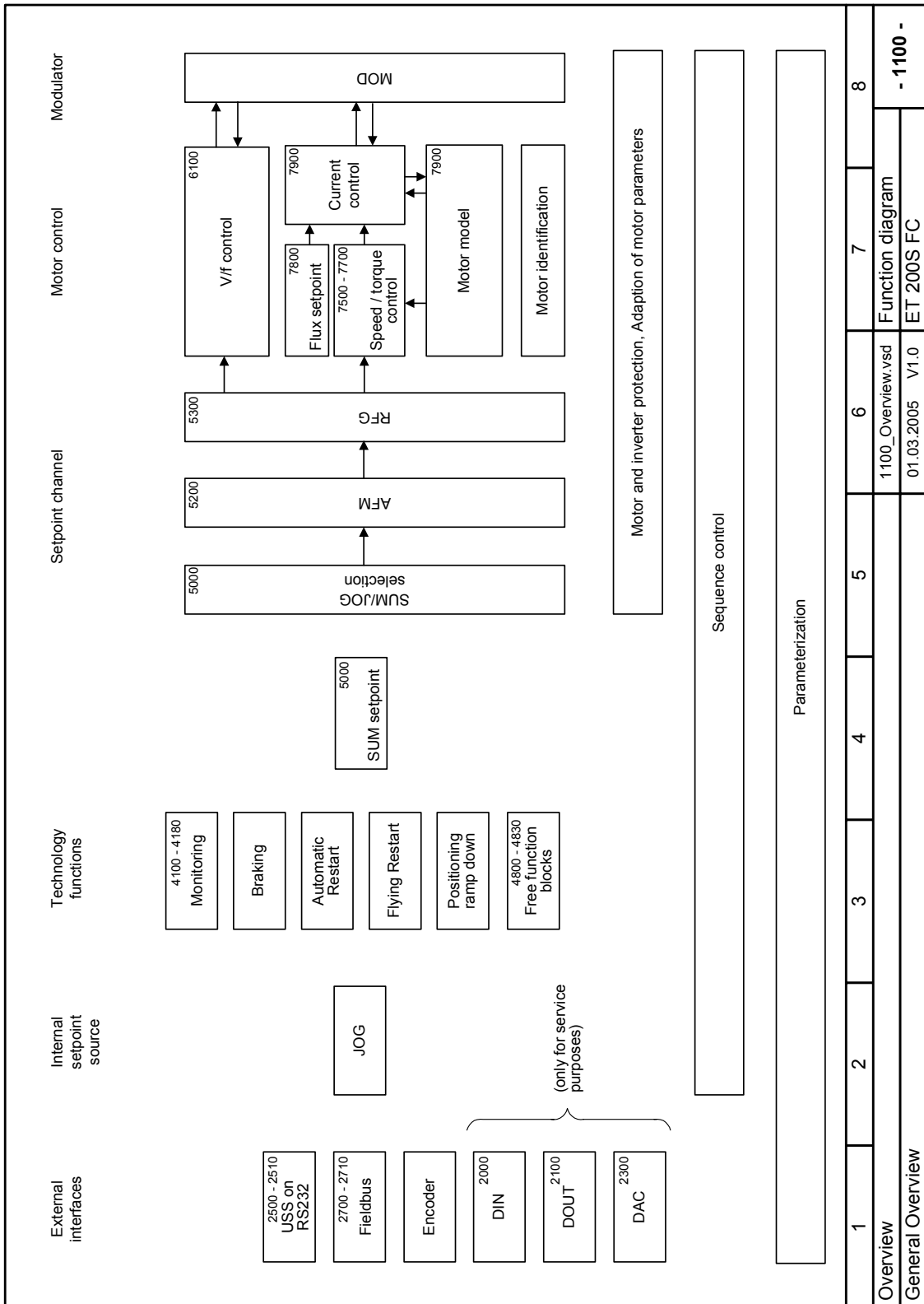
Note:

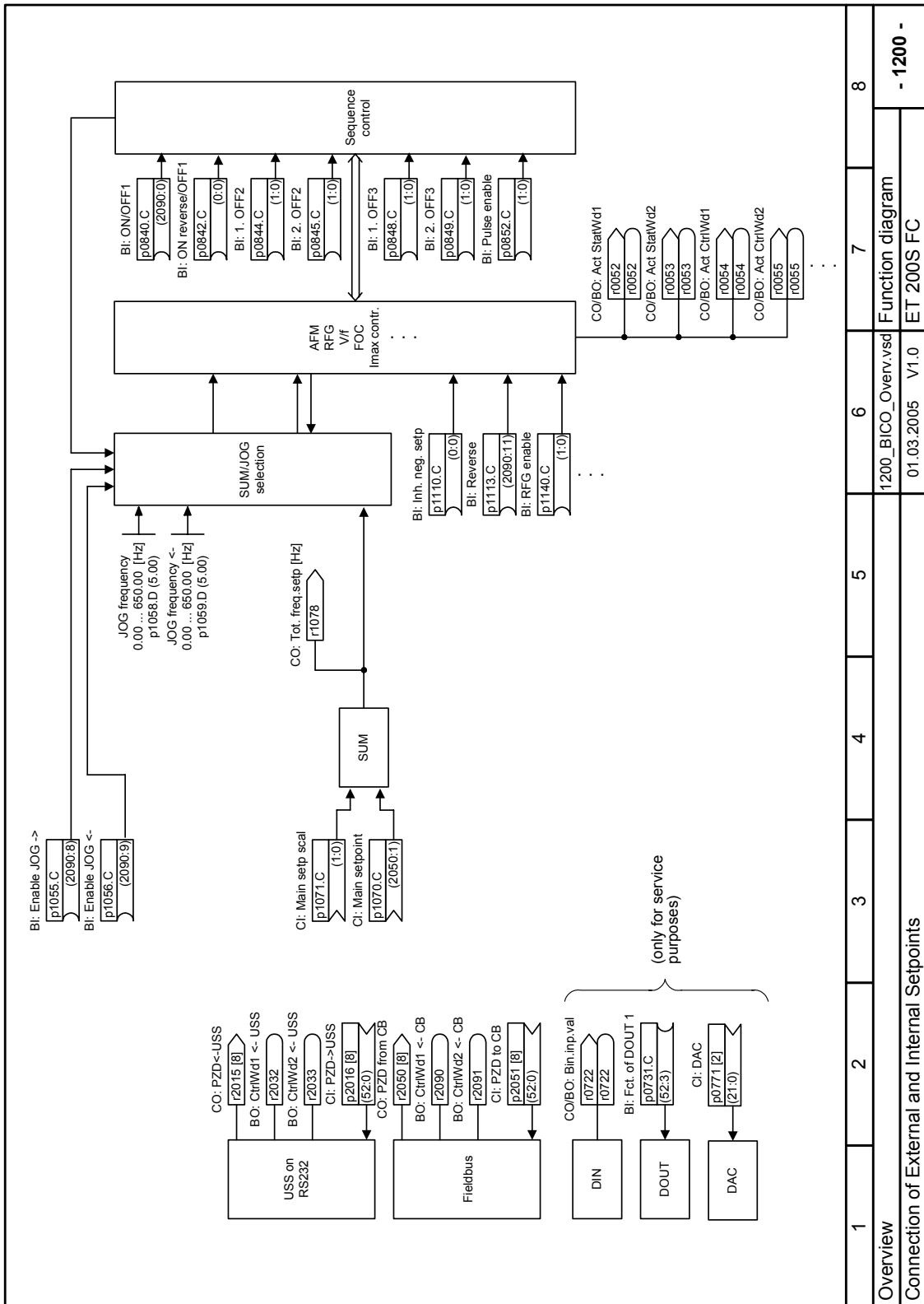
Enter the reading of r9798 or r9898 into p9899 once the safety parametrisation is complete.

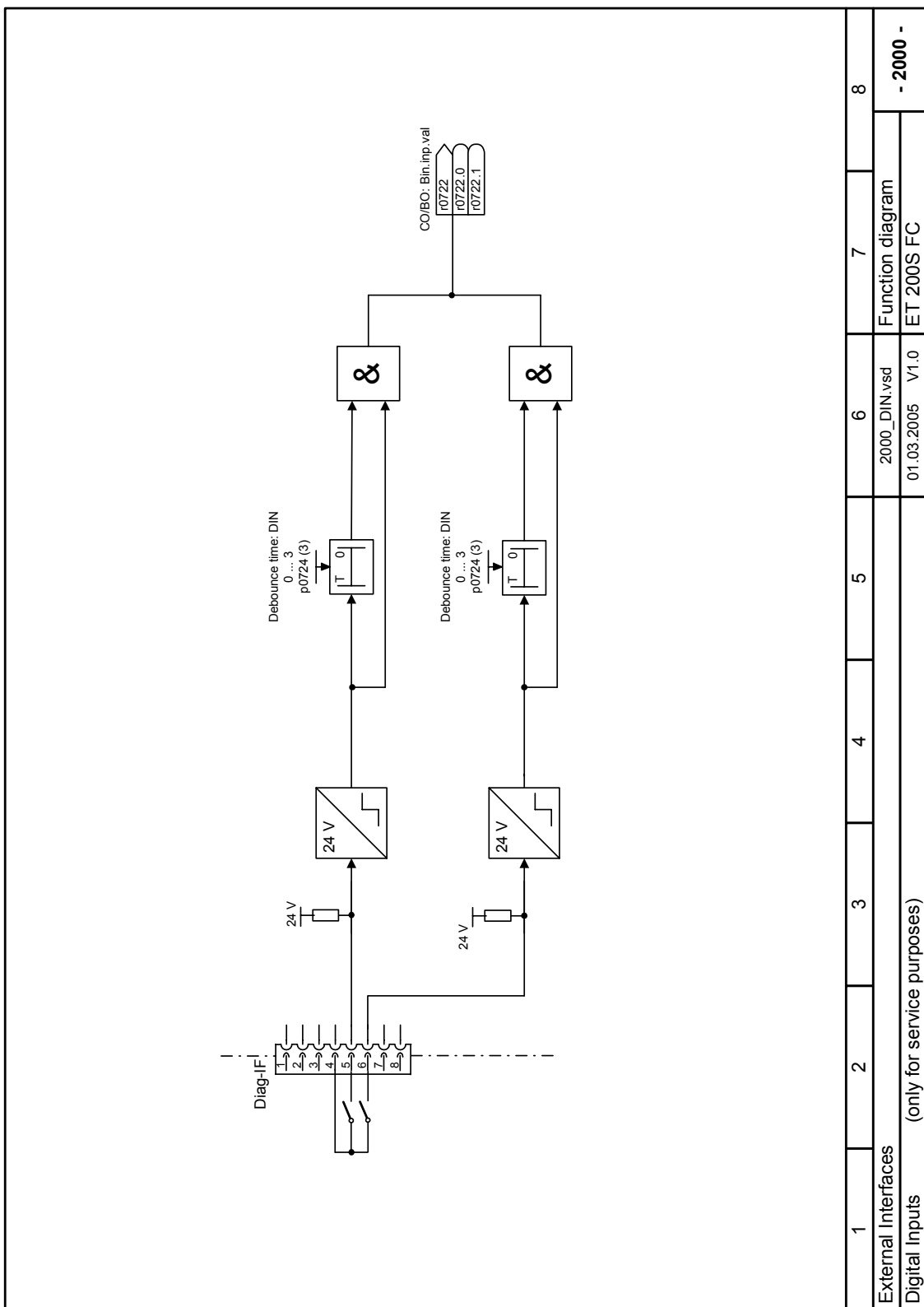
Function Diagrams

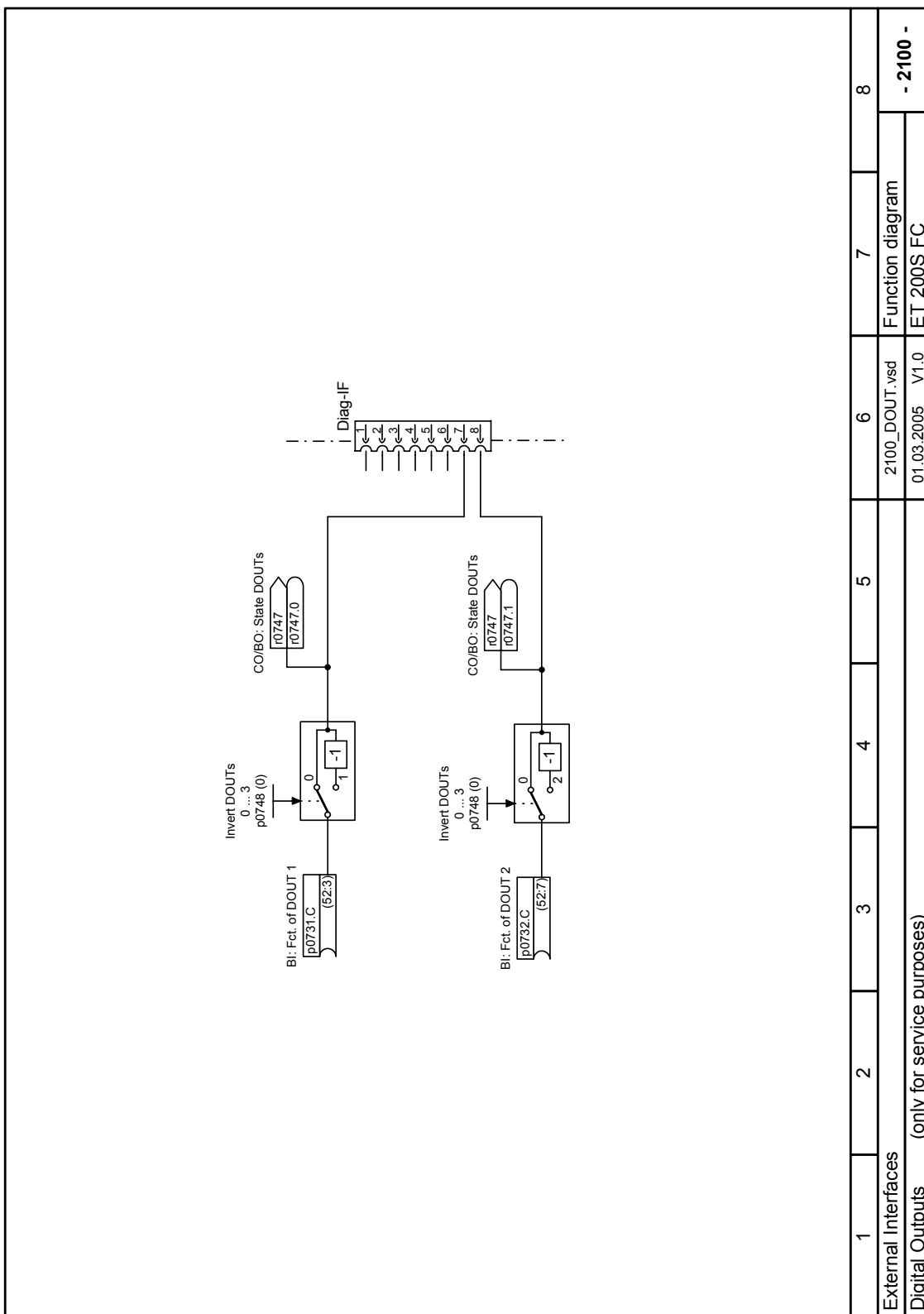
2

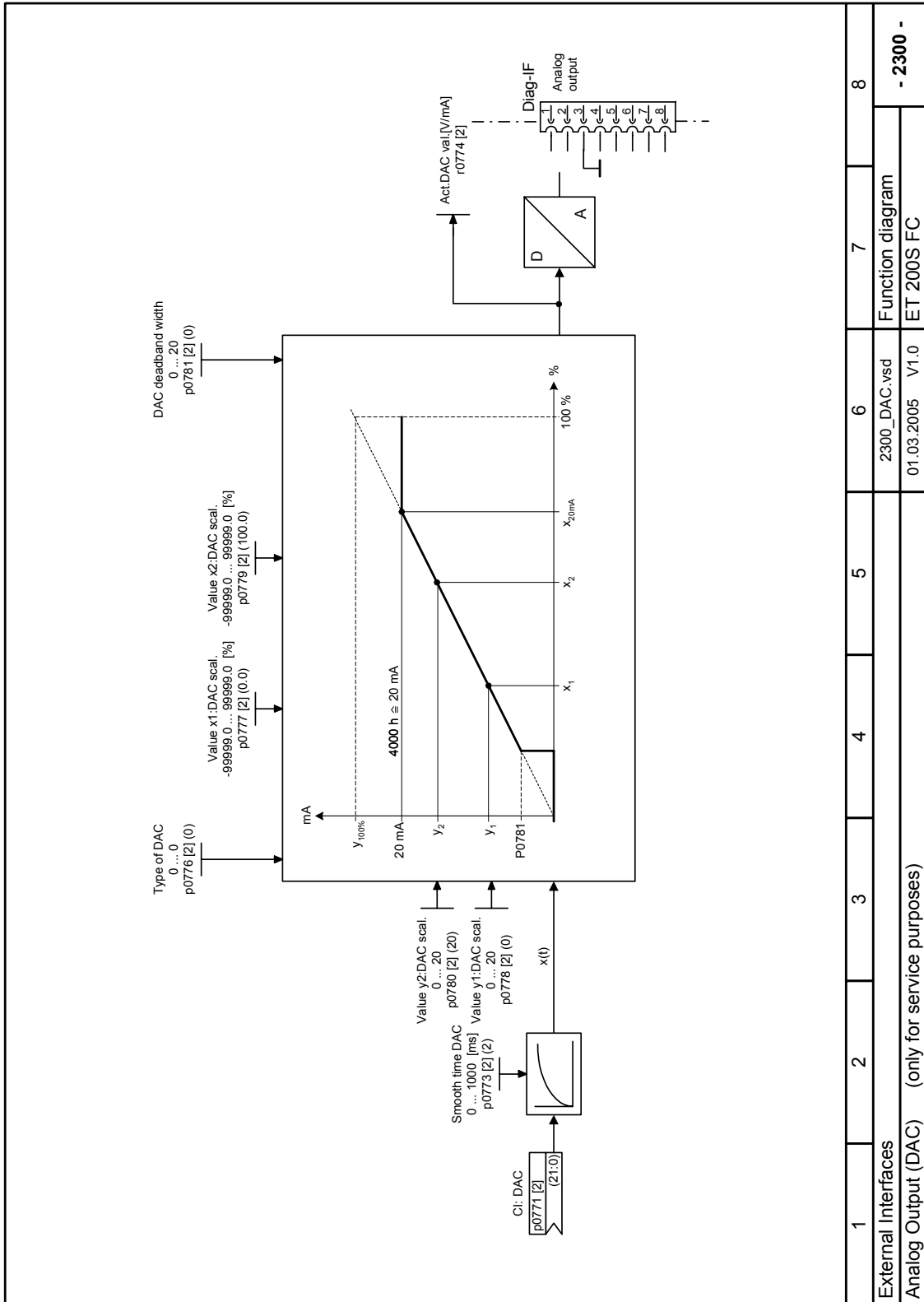
Explanation of symbols used in the function diagrams							
<p>Setting parameters</p> <ul style="list-style-type: none"> Parameter text Min ... Max [Dim] Minimum ... Maximum value [Unit] PNumber.C/D [3] (Default) Parameter number.Command/Drive data set [Number indexes] (Default) <p>↓</p> <p>Monitoring parameters</p> <ul style="list-style-type: none"> Parameter text [Unit] Parameter number.Command/Drive data set [Number indexes] <p>↑</p> <p>BICO parameters</p> <ul style="list-style-type: none"> Binector input (Setting parameter) <ul style="list-style-type: none"> Parameter text [Unit] Parameter number.Command/Drive data set (Default) Binector output (Monitoring parameter) <ul style="list-style-type: none"> Parameter text Parameter number Connector input (Setting parameter) <ul style="list-style-type: none"> Parameter text Parameter number.Command/Drive data set [Number indexes] (Default) Connector output (Monitoring parameter) <ul style="list-style-type: none"> Parameter text [Unit] Parameter number [Number indexes] Connector/Binector output (Monitoring parameter) <ul style="list-style-type: none"> Parameter text Parameter number 	<p>Summation</p> <p>Multiplication</p> <p>Division</p> <p>Switch</p> <p>Selection switch (1 out of 4)</p> <p>ON delay</p> <p>OFF delay</p> <p>ON and OFF delay</p> <p>AND gate</p> <p>OR gate</p> <p>NOT gate</p> <p>NOT gate</p> <p>A/D converter</p> <p>D/A converter</p>	<p>Filter element</p> <p>Gain element</p> <p>Integrator</p> <p>PI controller</p> <p>Differentiator</p> <p>Limitation</p> <p>Limitation</p> <p>Characteristic</p> <p>Hysteresis</p>	             	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p>	<p>0010_Symbols.vsd</p> <p>01.03.2005 V1.0</p>	<p>Function diagram</p> <p>ET 200S FC</p>	<p>- 10 -</p>
Symbols in funktion diagrams							

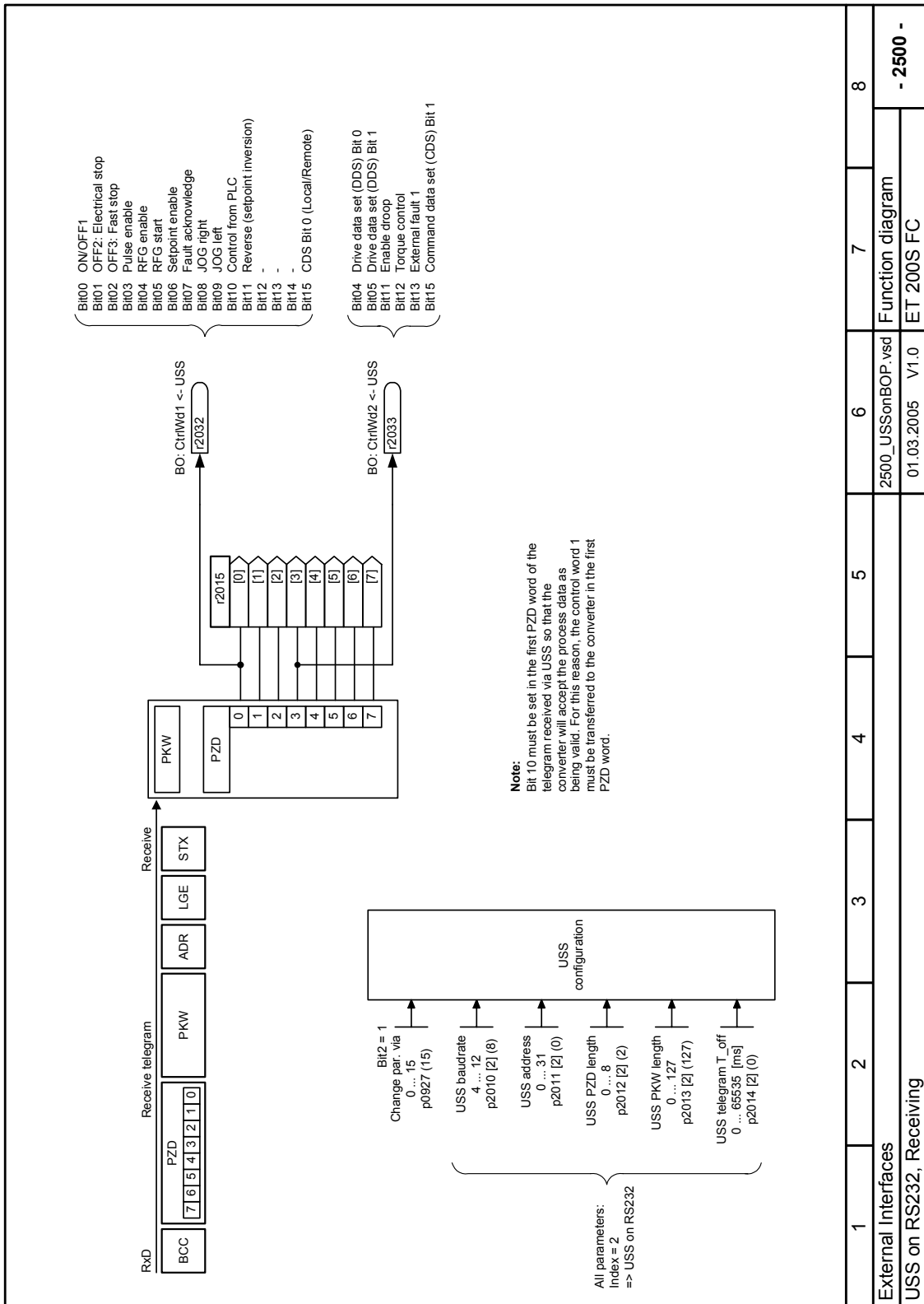




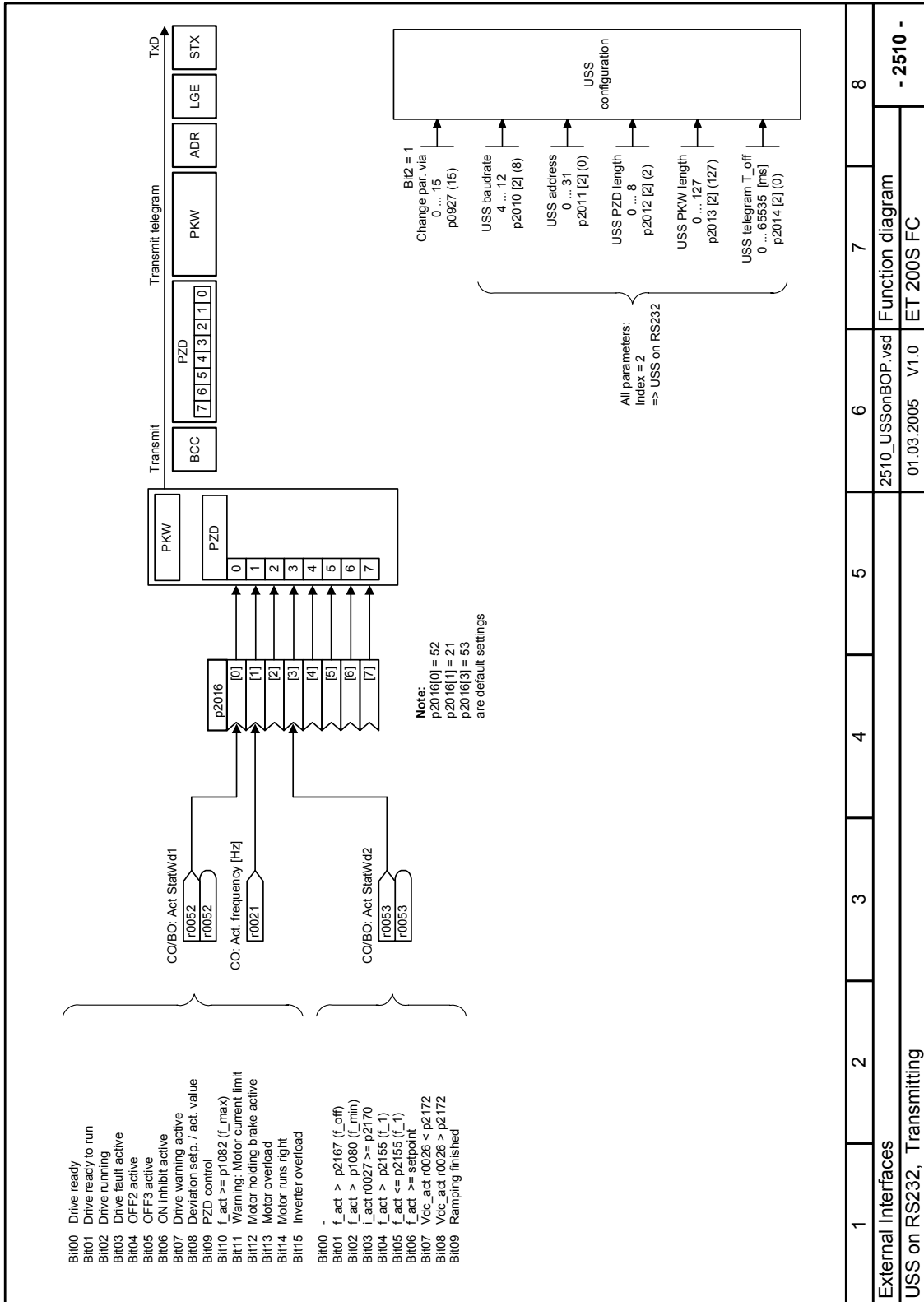


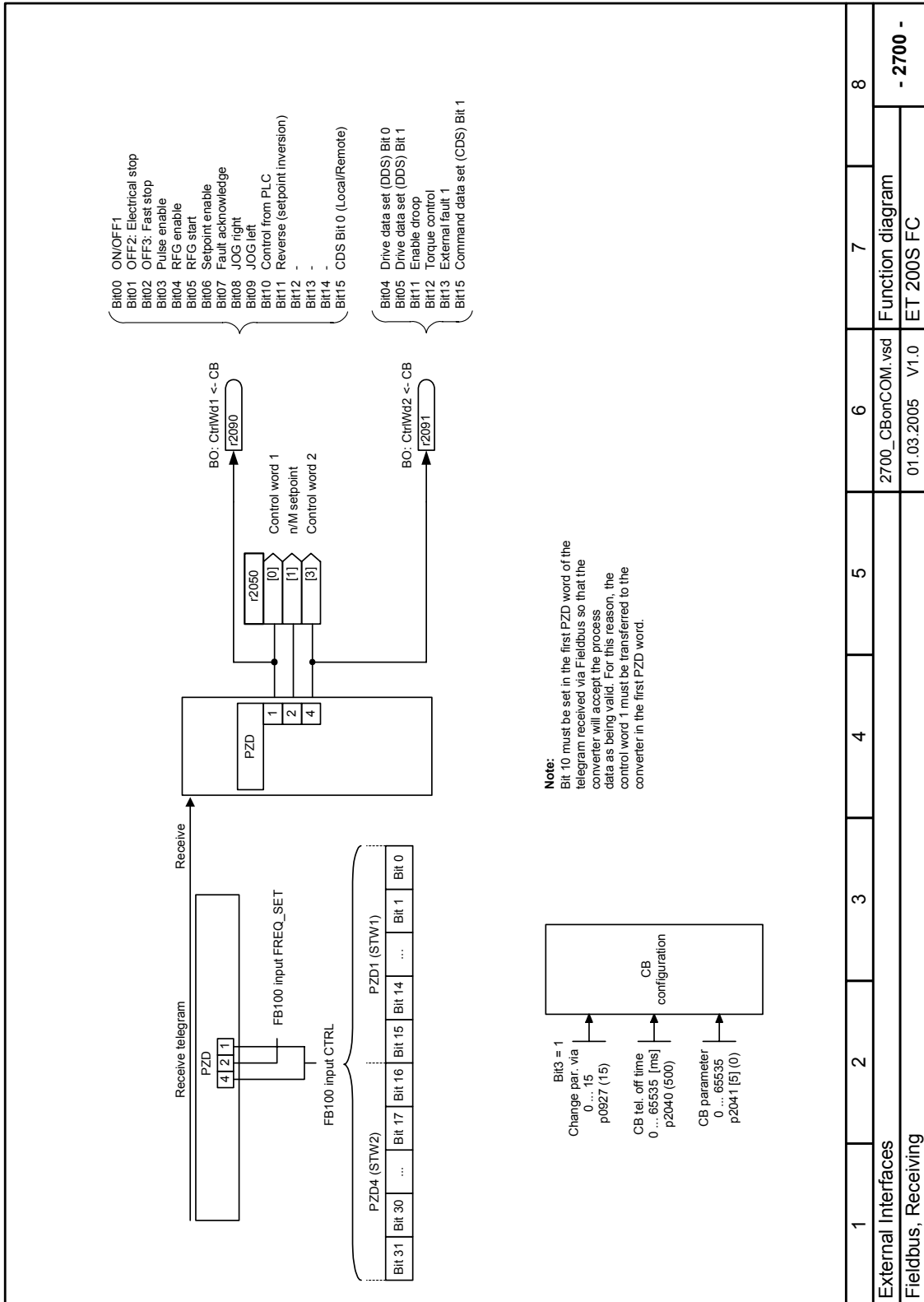


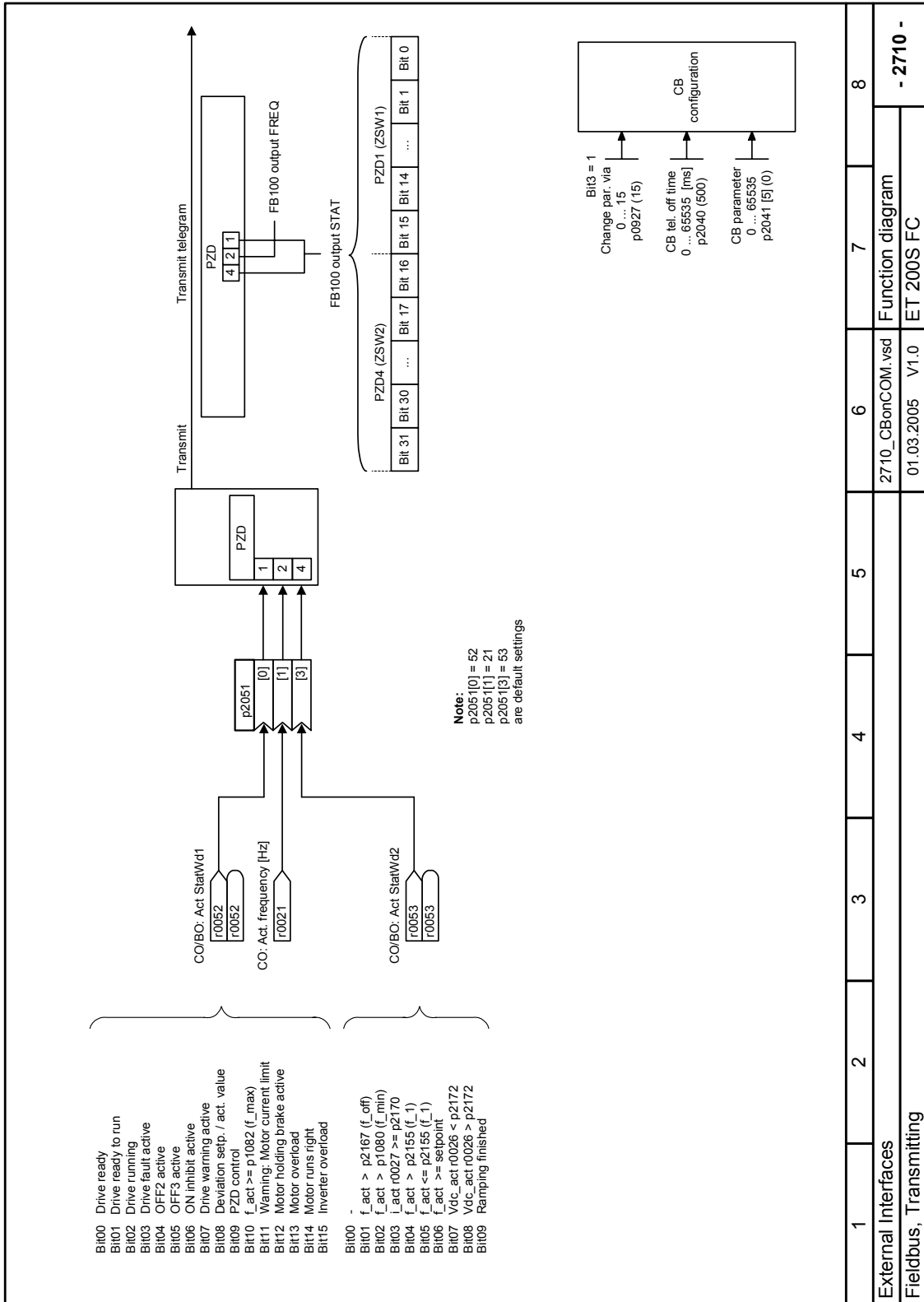


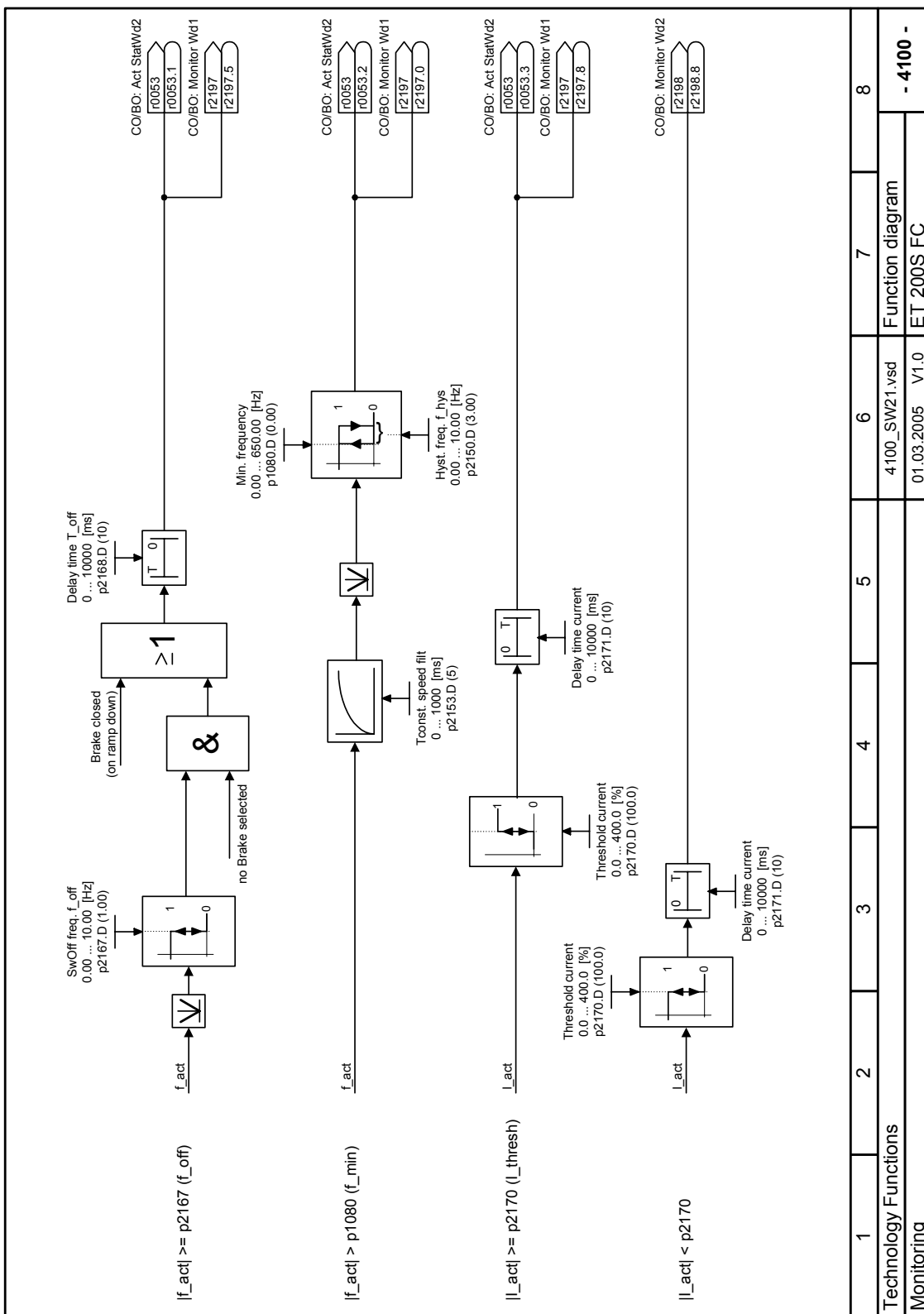


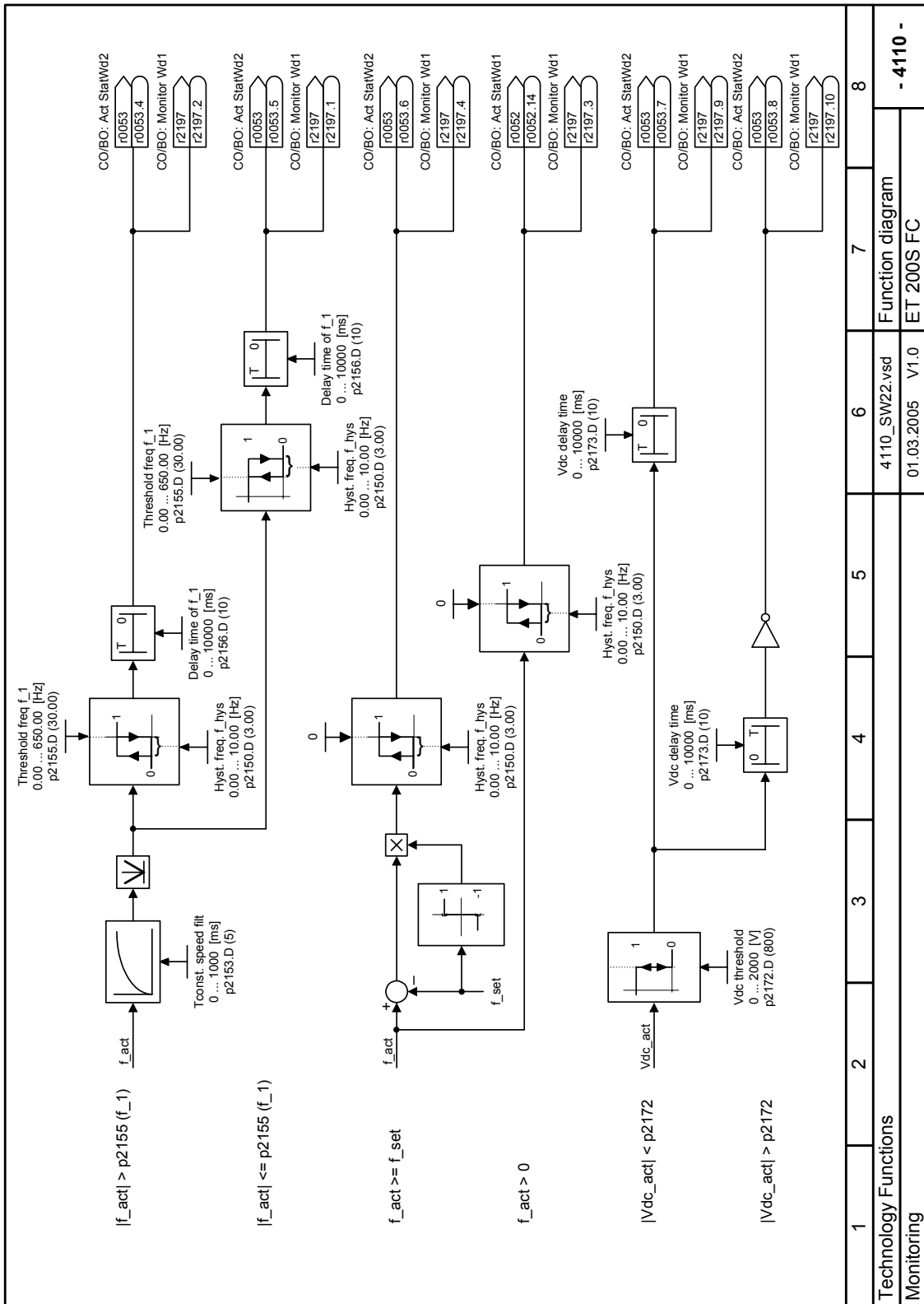
1	2	3	4	5	6	7	8
External Interfaces							
USS on RS232, Receiving							
2500_USSonBOP.vsd						Function diagram	
01.03.2005 V1.0						ET 2005 FC	
- 2500 -							

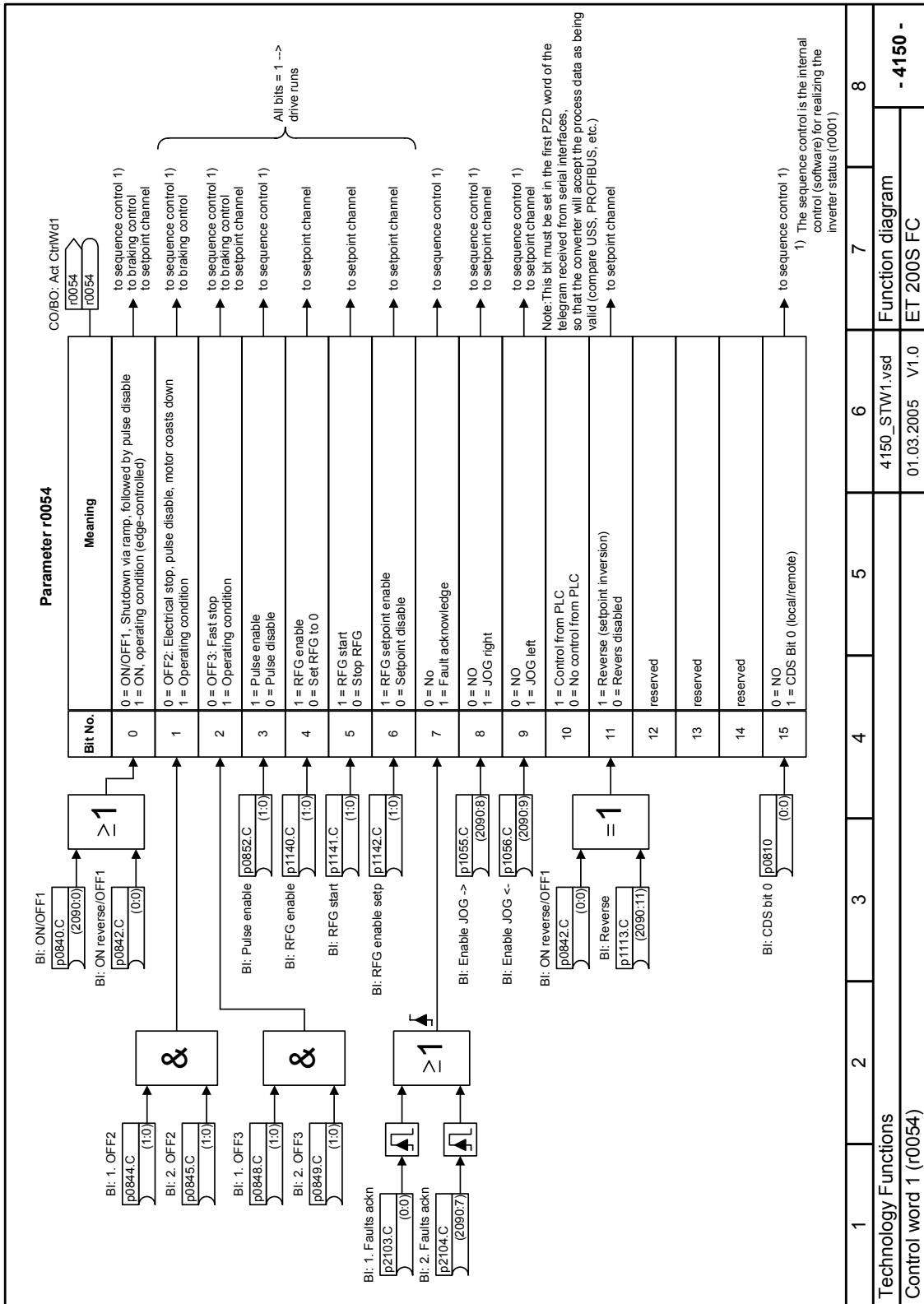


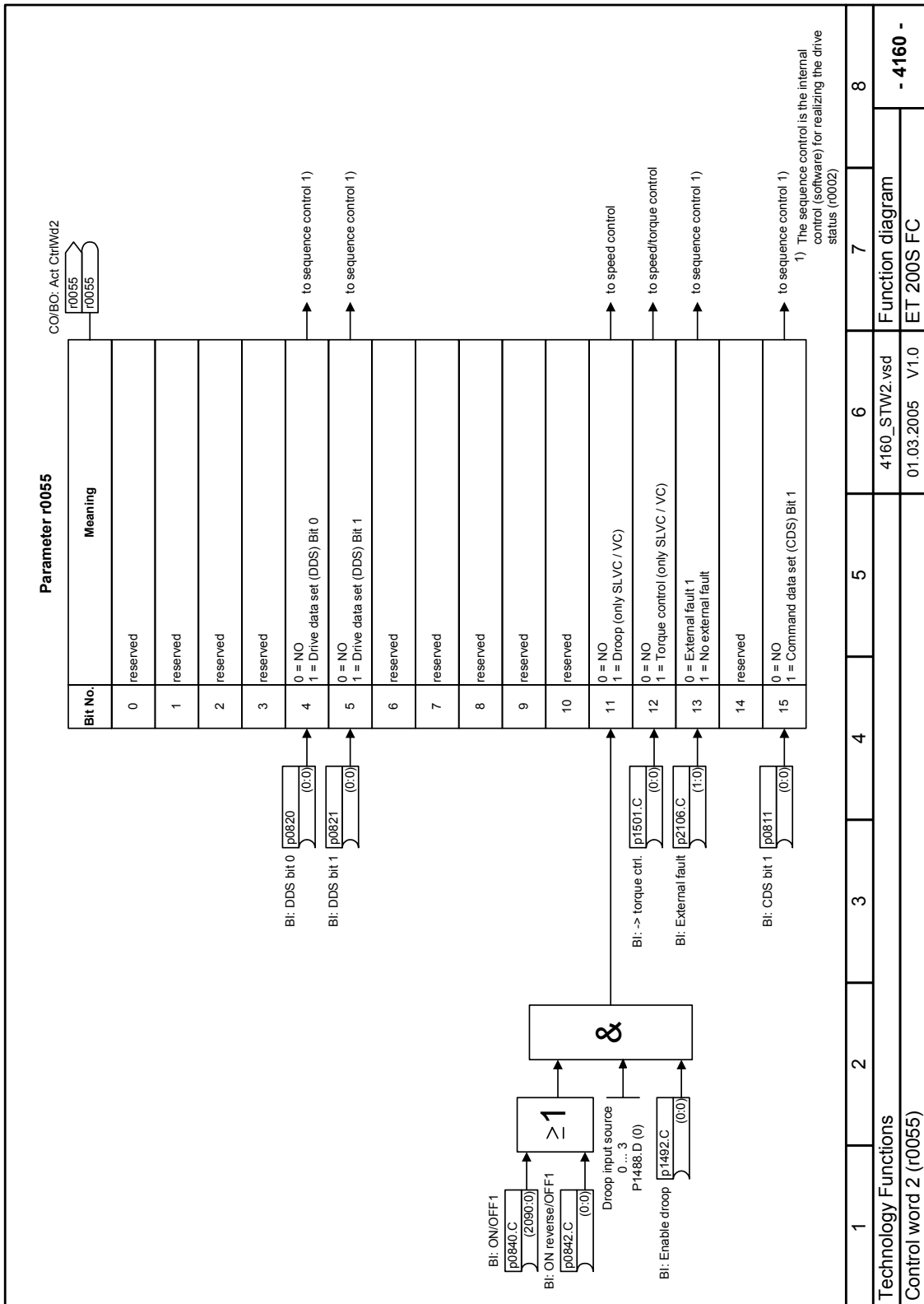












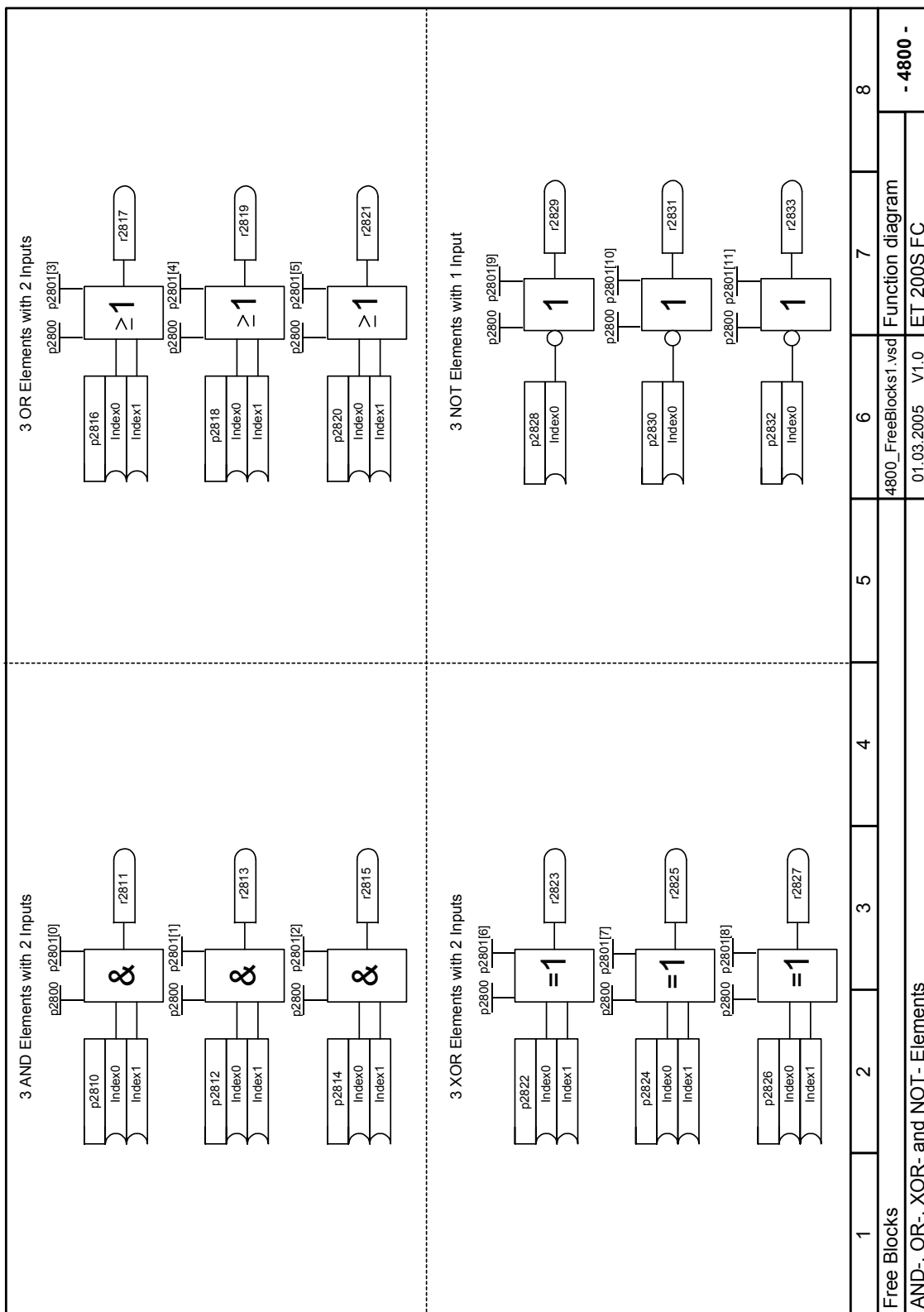
Parameter r0052		CO/BO: Act StatWd1	
Bit No.	Meaning	r0052	r0052
0	1 = Drive ready 0 = Drive not ready		
1	1 = Drive ready to run (DC link loaded, pulses disabled) 0 = Drive not ready to run		
2	1 = Drive running (voltage at output terminals) 0 = Pulses disabled		
3	1 = Drive fault active (pulses disabled) 0 = No fault		
4	0 = OFF2 active 1 = No OFF2		
5	0 = OFF3 active 1 = No OFF3		
6	1 = ON inhibit active 0 = No On inhibit (possible to switch on)		
7	1 = Drive warning active 0 = No warning		
8	0 = Deviation setpoint / act. value 1 = No deviation setpoint / act. value		
9	1 = PZD control (always 1)		
10	1 = Maximum frequency reached 0 = Maximum frequency not reached		
11	0 = Warning: Motor current limit 1 = Motor current limit not reached		
12	1 = Motor holding brake active 0 = Motor holding brake not active		
13	0 = Motor overload 1 = No Motor overload		
14	1 = Motor runs right 0 = Motor does not run right		
15	0 = Inverter overload 1 = No inverter overload		

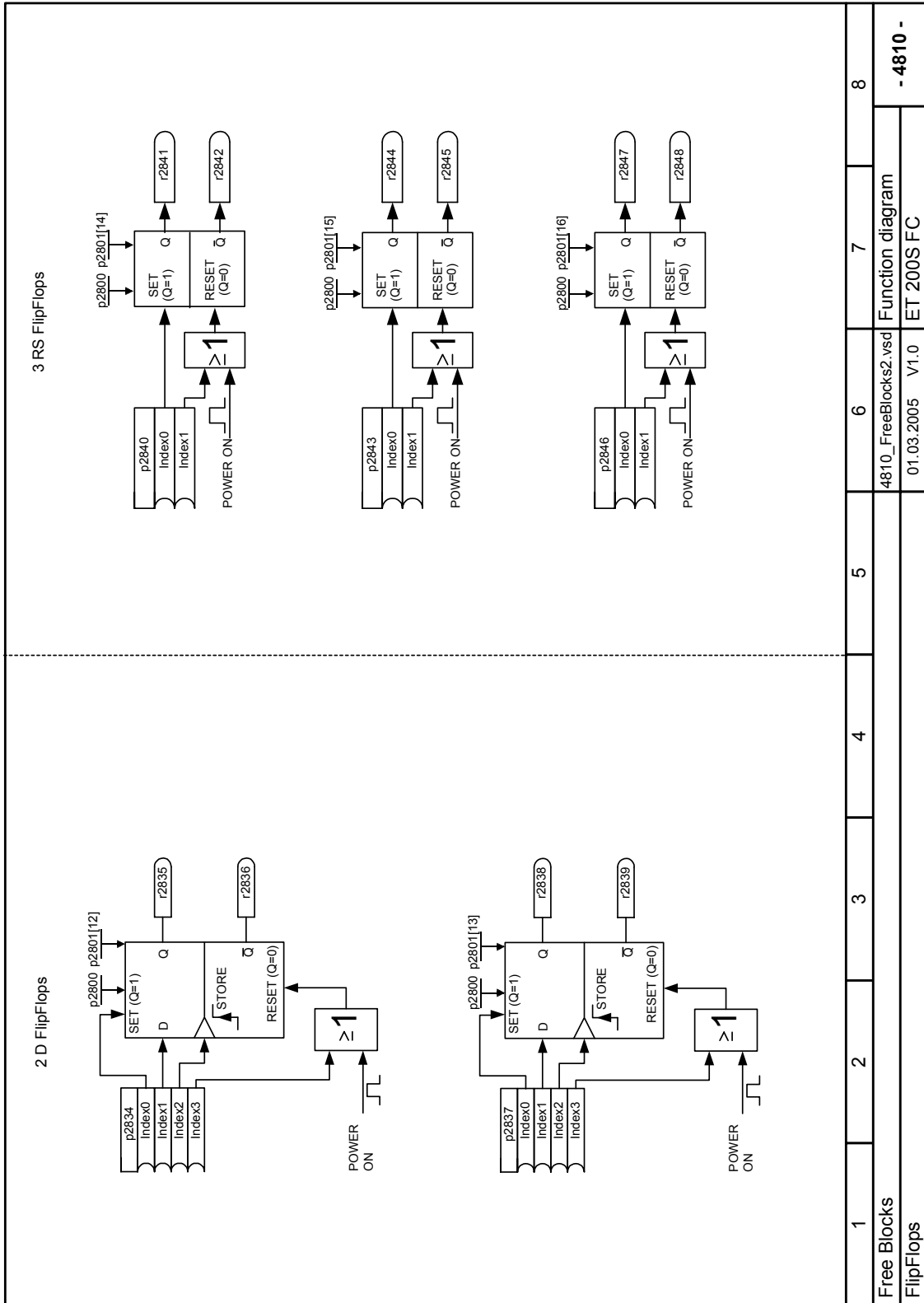
Signal "Fault active" is inverted by ET 200S FC if connected to a digital output which means that the relay will be in the de-energised state.

1) The sequence control is the internal control (software) for realizing the drive status (r0002)

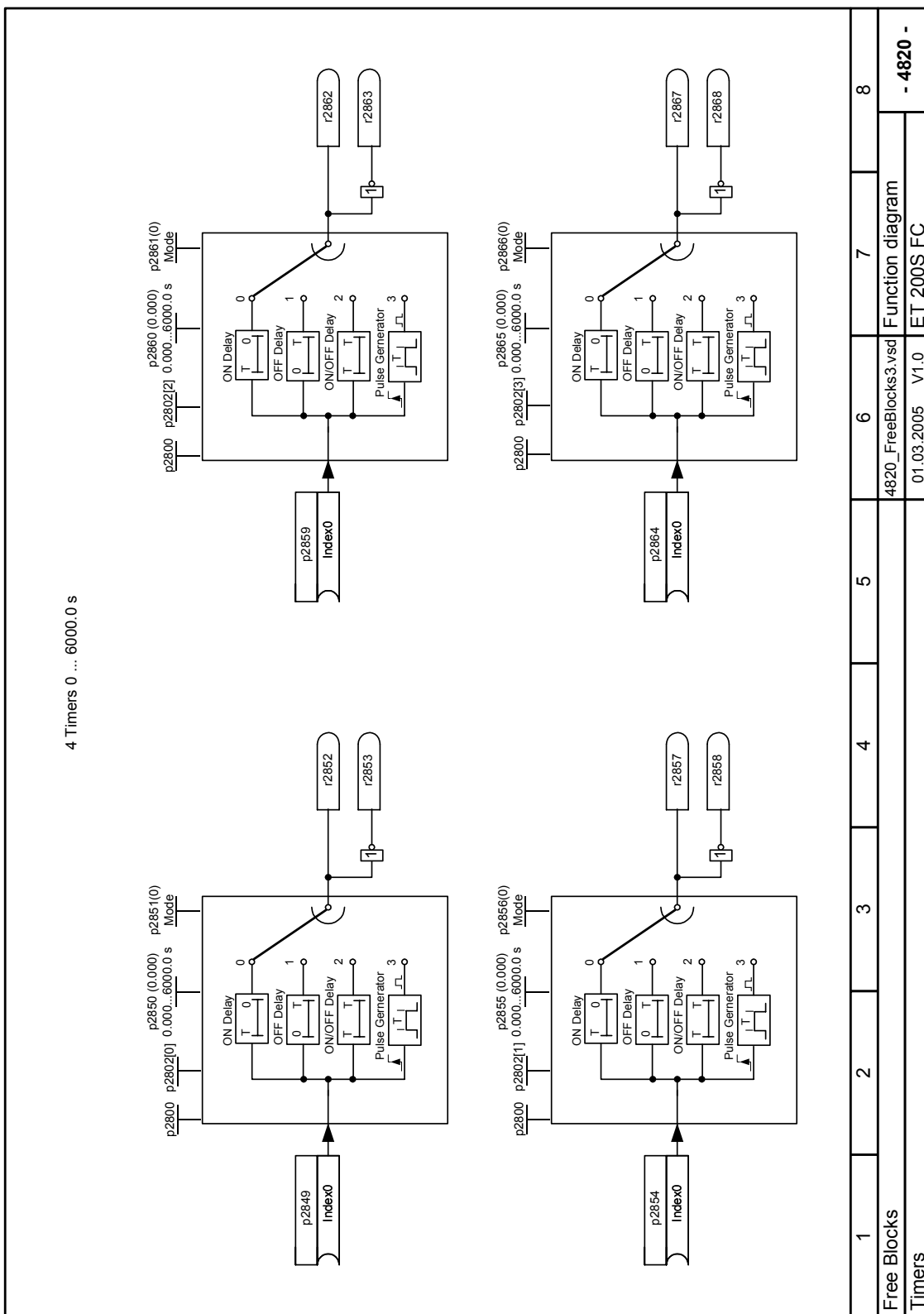
1	2	3	4	5	6	7	8
Technology Functions		4170_ZSW1.vsd		01.03.2005 V1.0		Function diagram	
Status word 1 (r0052)		ET 200S FC				- 4170 -	

Parameter r0053		CO/BO: Act StatWd2	
Bit No.	Meaning	r0053	r0053
0	reserved		
1	from alarm processing 1 = f_act > P2167 (f_off)		
2	from messages 1 = f_act >= P1080 (f_min)		
3	from alarm processing 1 = Act. current r0027 >= P2170		
4	from messages 1 = f_act > P2155 (f_1)		
5	from messages 1 = f_act <= P2155 (f_1)		
6	from messages 1 = f_act >= setpoint		
7	from messages 1 = Act. Vdc r0026 < P2172		
8	from alarm processing 1 = Act. Vdc r0026 > P2172		
9	from sequence control 1) 1 = Ramping finished		
10	reserved		
11	reserved		
12	reserved		
13	reserved		
14	reserved		
15	reserved		
1)		The sequence control is the internal control (software) for realizing the drive status (r0002)	
1	Technology Functions	6	8
Status word 2 (r0053)		4180_ZSW2.vsd	Function diagram
		01.03.2005 V1.0	ET 200S FC
		- 4180 -	

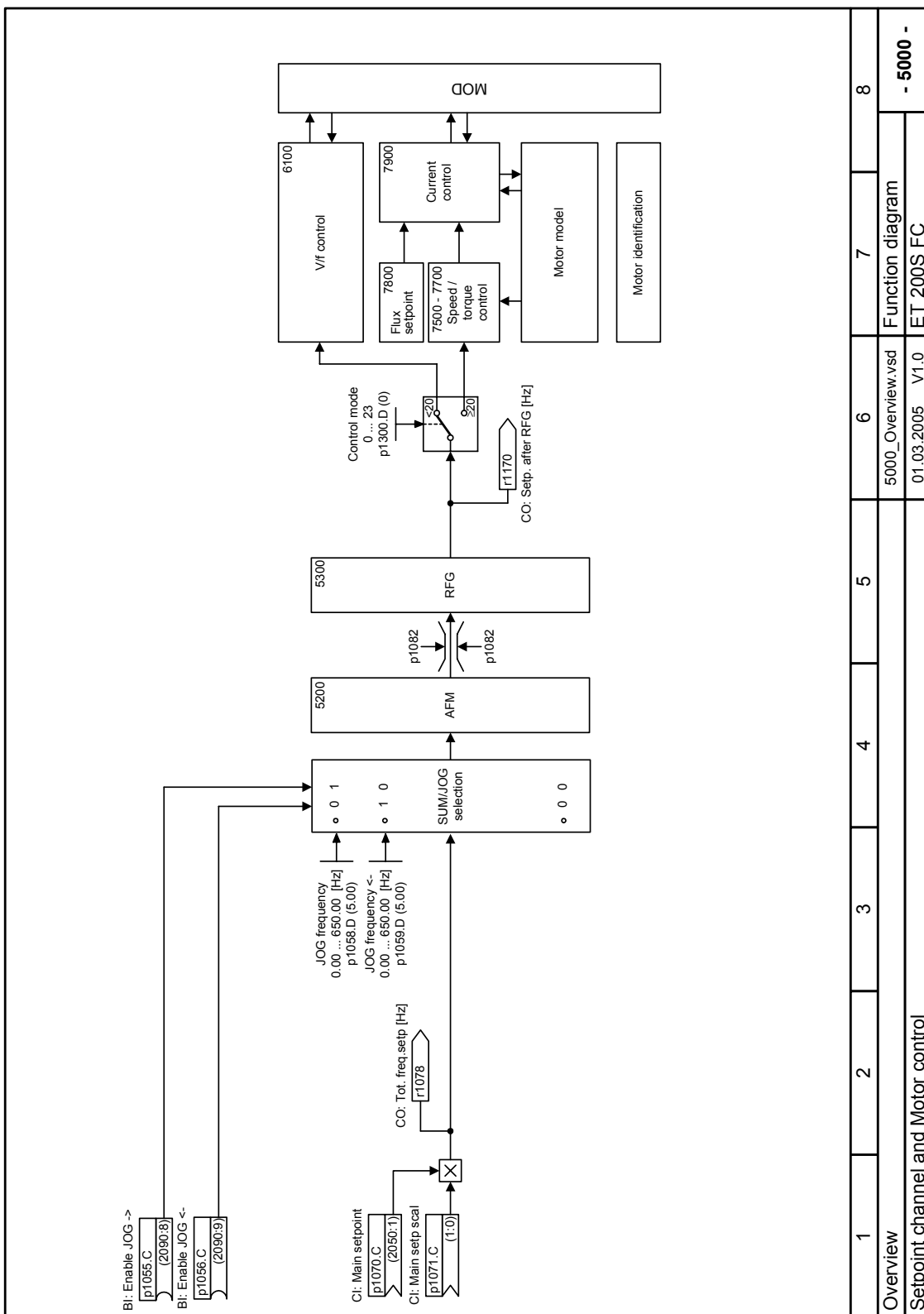


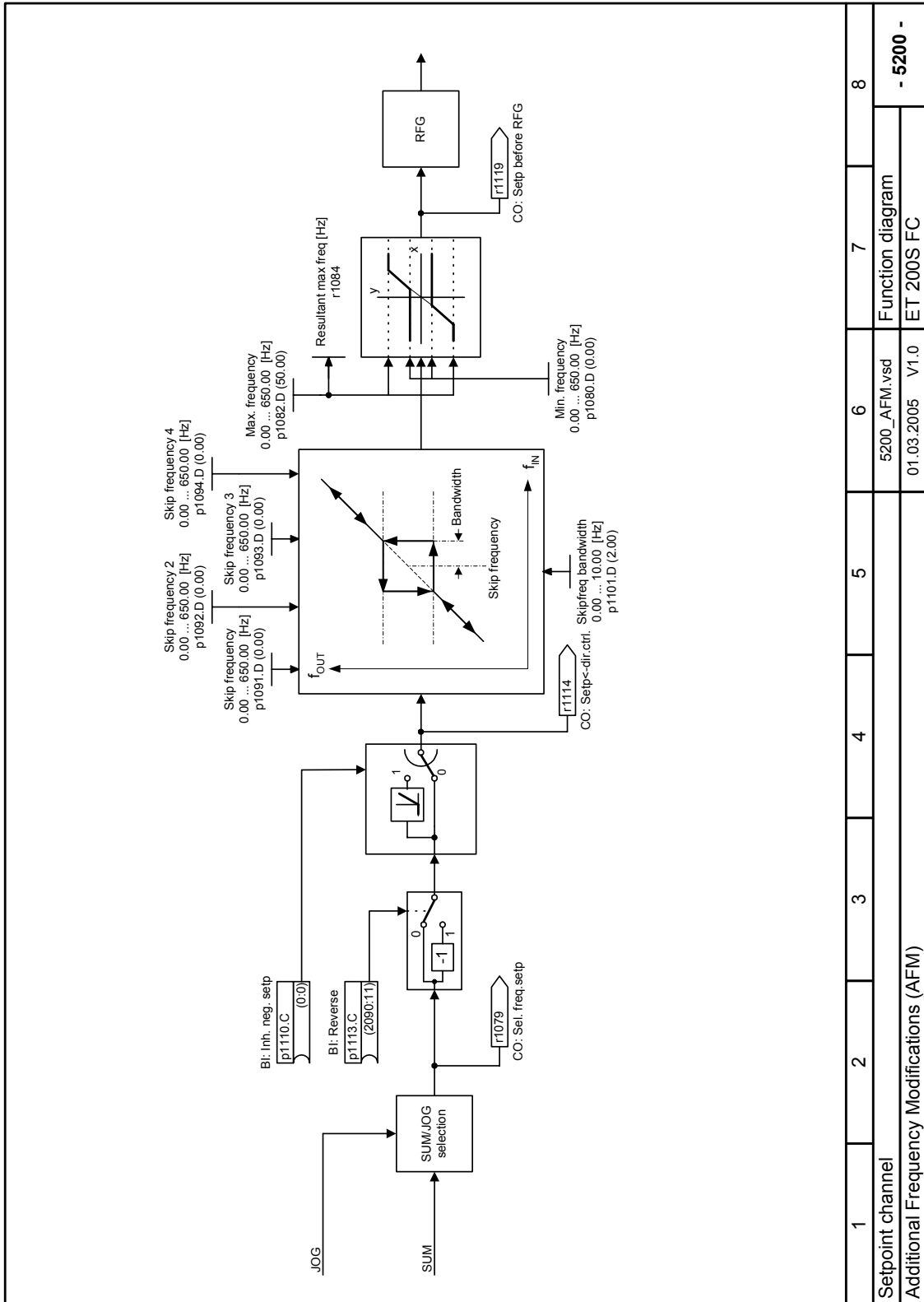


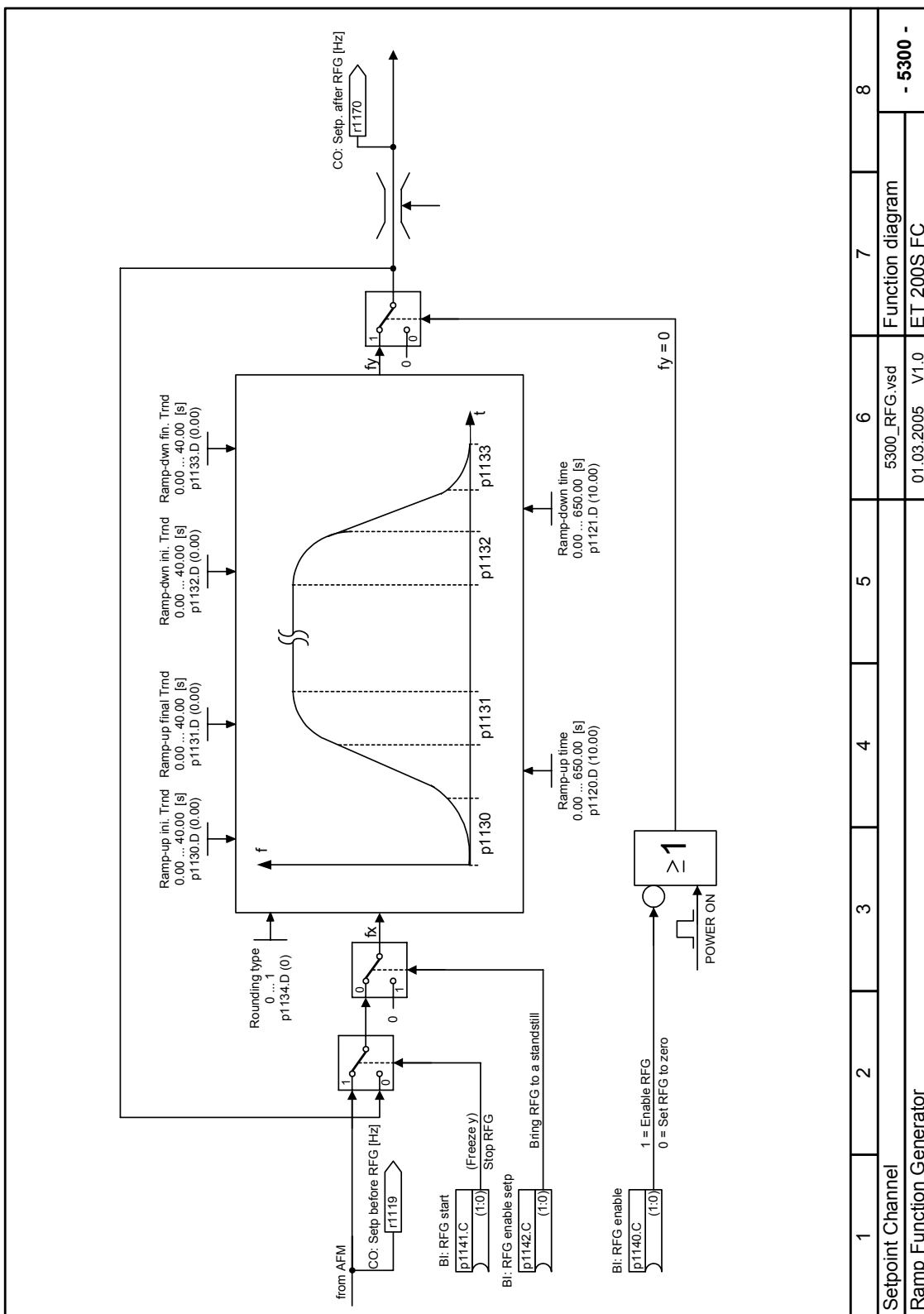
1	2	3	4	5	6	7	8
Free Blocks							
4810_FreeBlocks2.vsd							
Function diagram							
01.03.2005 V1.0							
ET 200S FC							
- 4810 -							

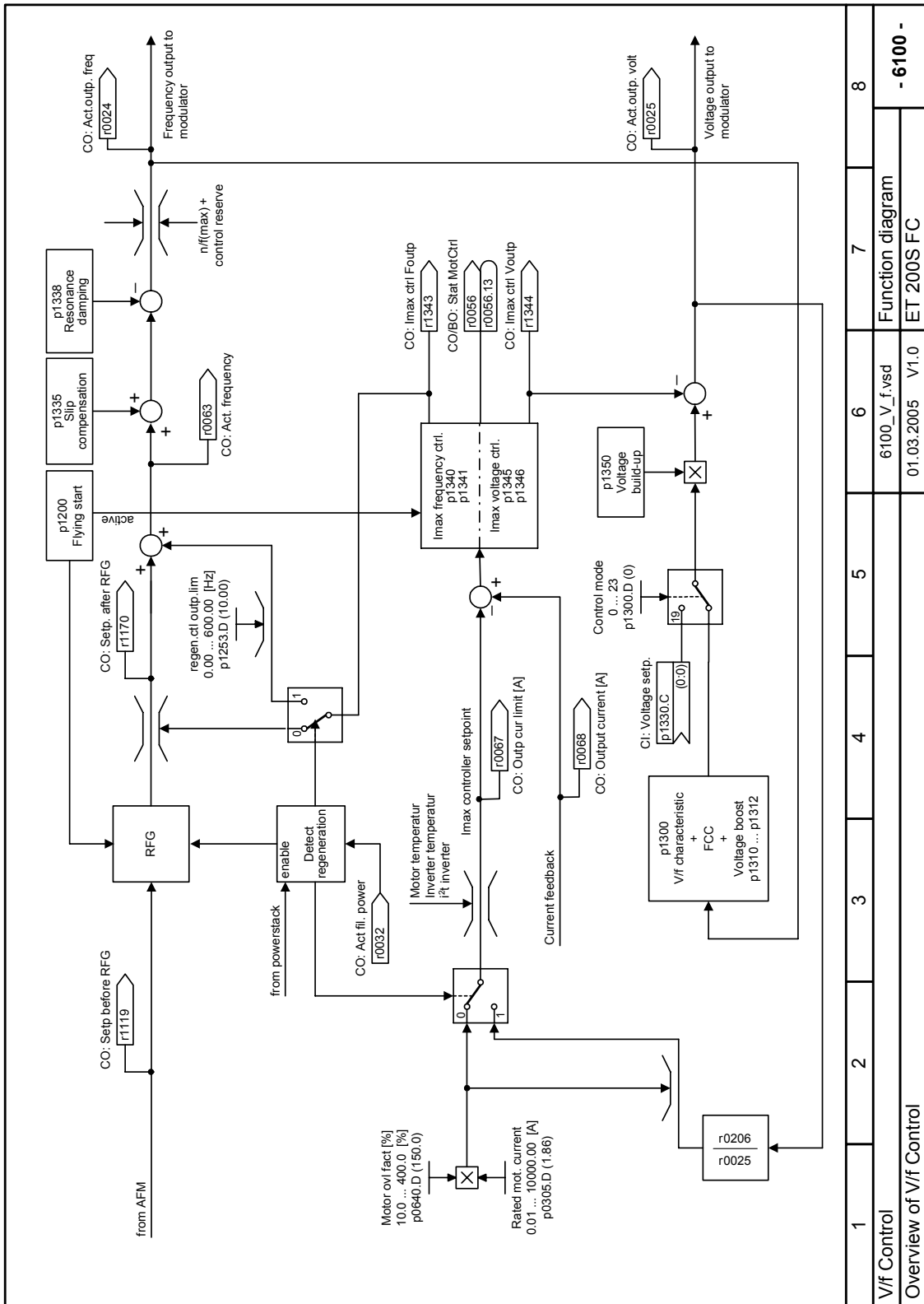


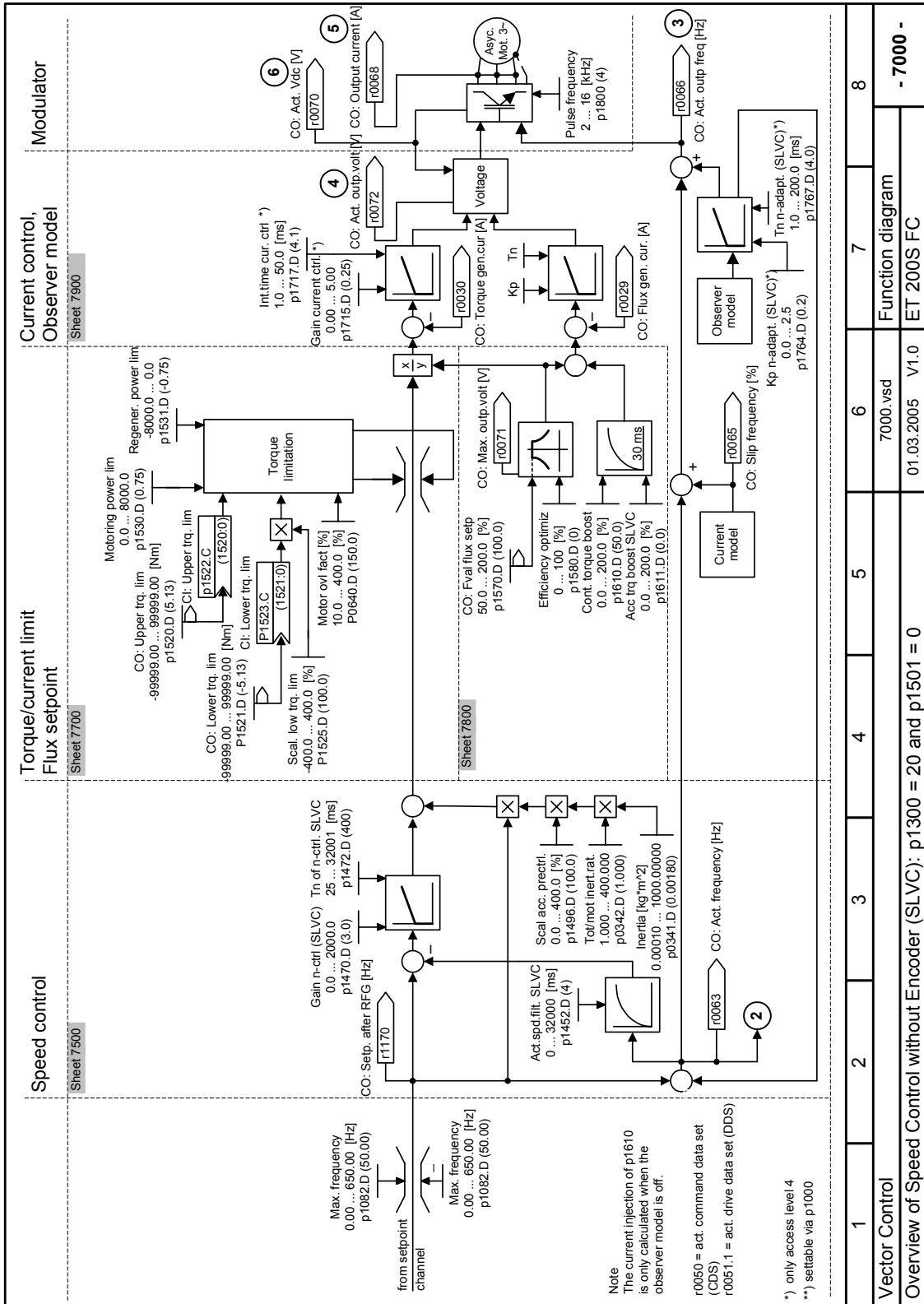
<p>2 Adders with 2 Inputs (1 Word)</p>	<p>2 Subtractors with 2 Inputs (1 Word)</p>	<p>2 Multipliers (1 Word)</p>					
<p>2 Dividers (1 Word)</p>							
<p>Word Compare</p>							
<p>Connector Setting in %</p>							
1	2	3	4	5	6	7	8
Free Blocks							
4830_FreeBlocks4.vsd							
Function diagram							
Comparators, Setting in %							
Multipliers, Dividers,							
Adders, Subtractors,							
ET 200S FC							
V1.0							
- 4830 -							

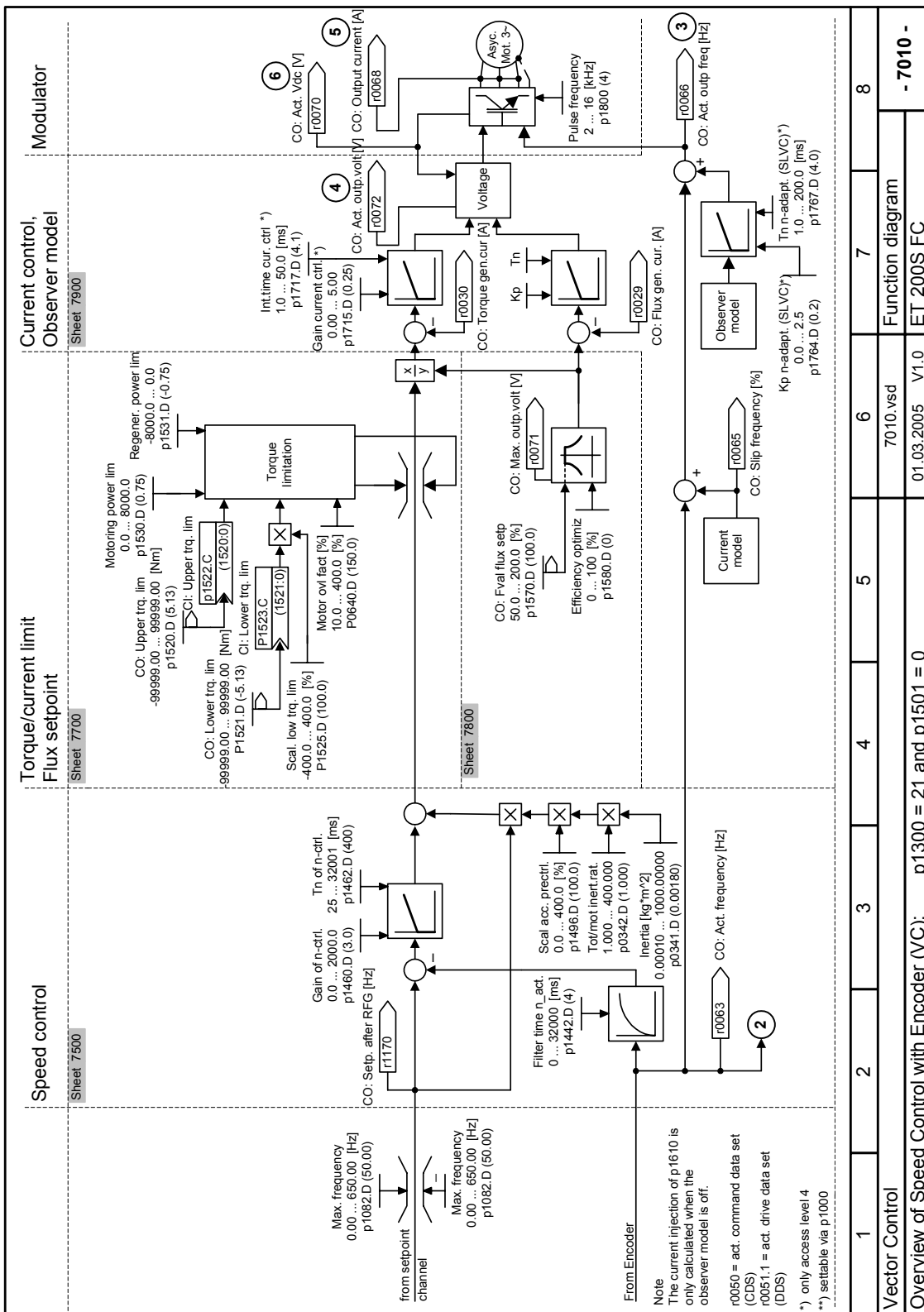


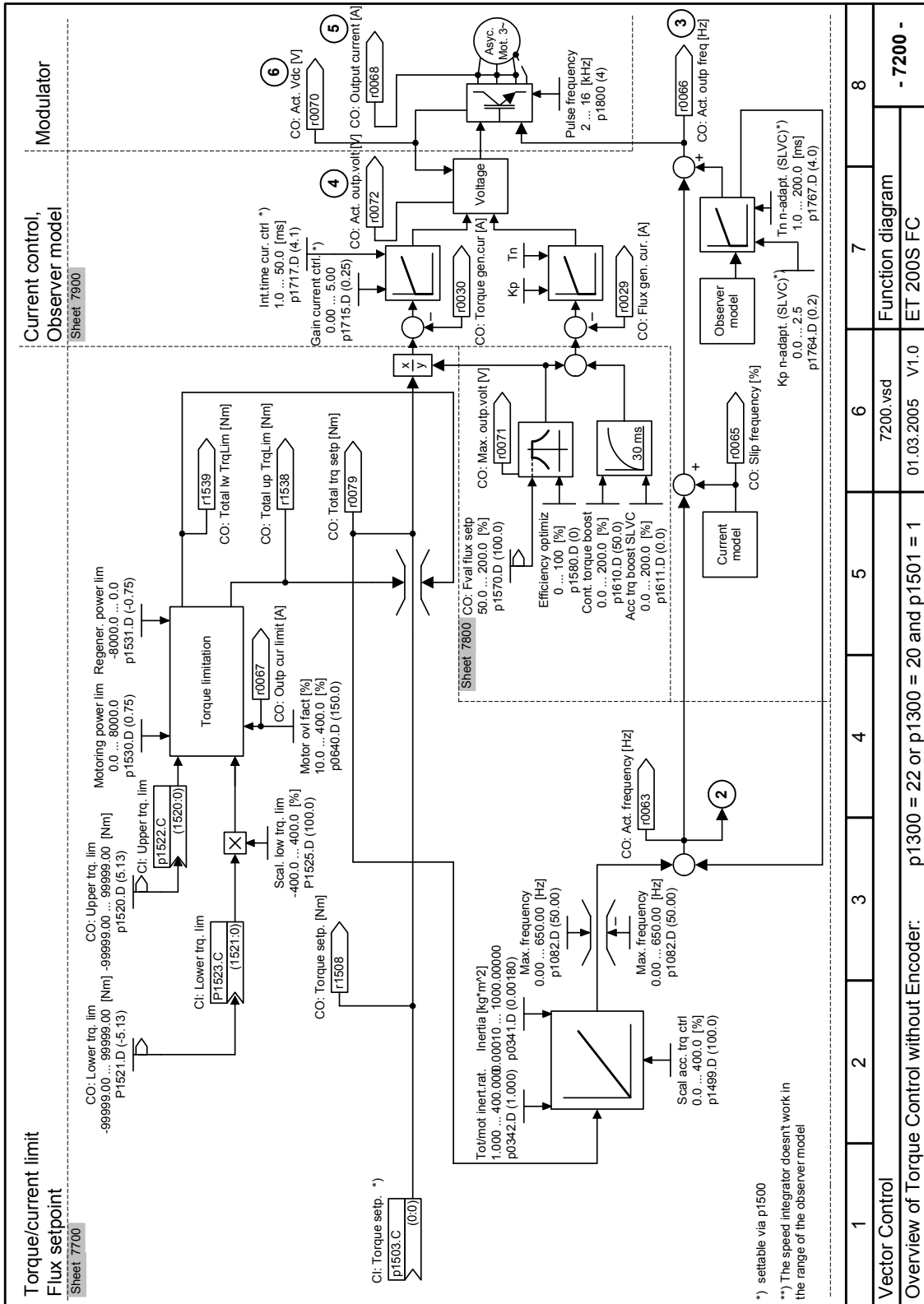




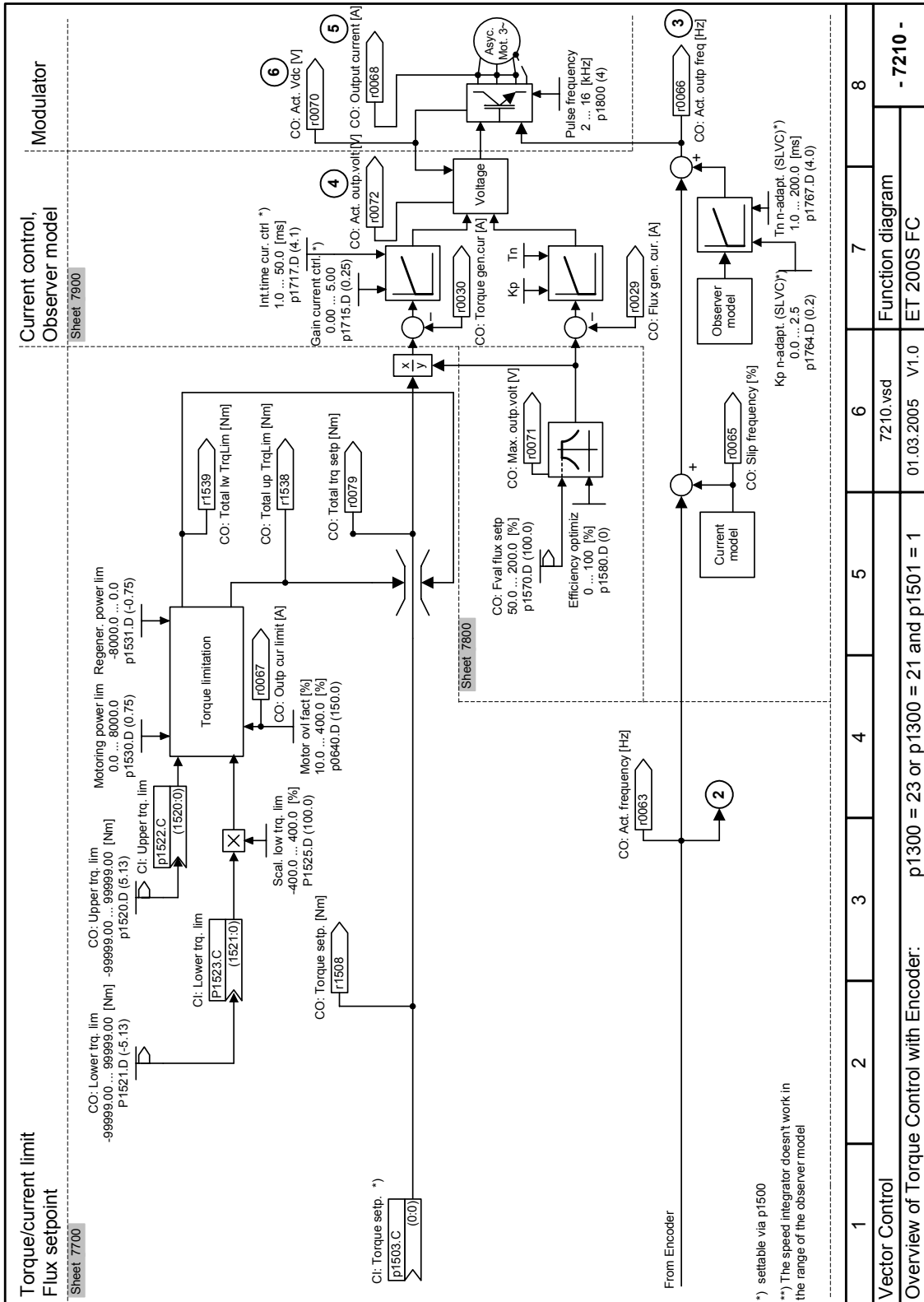


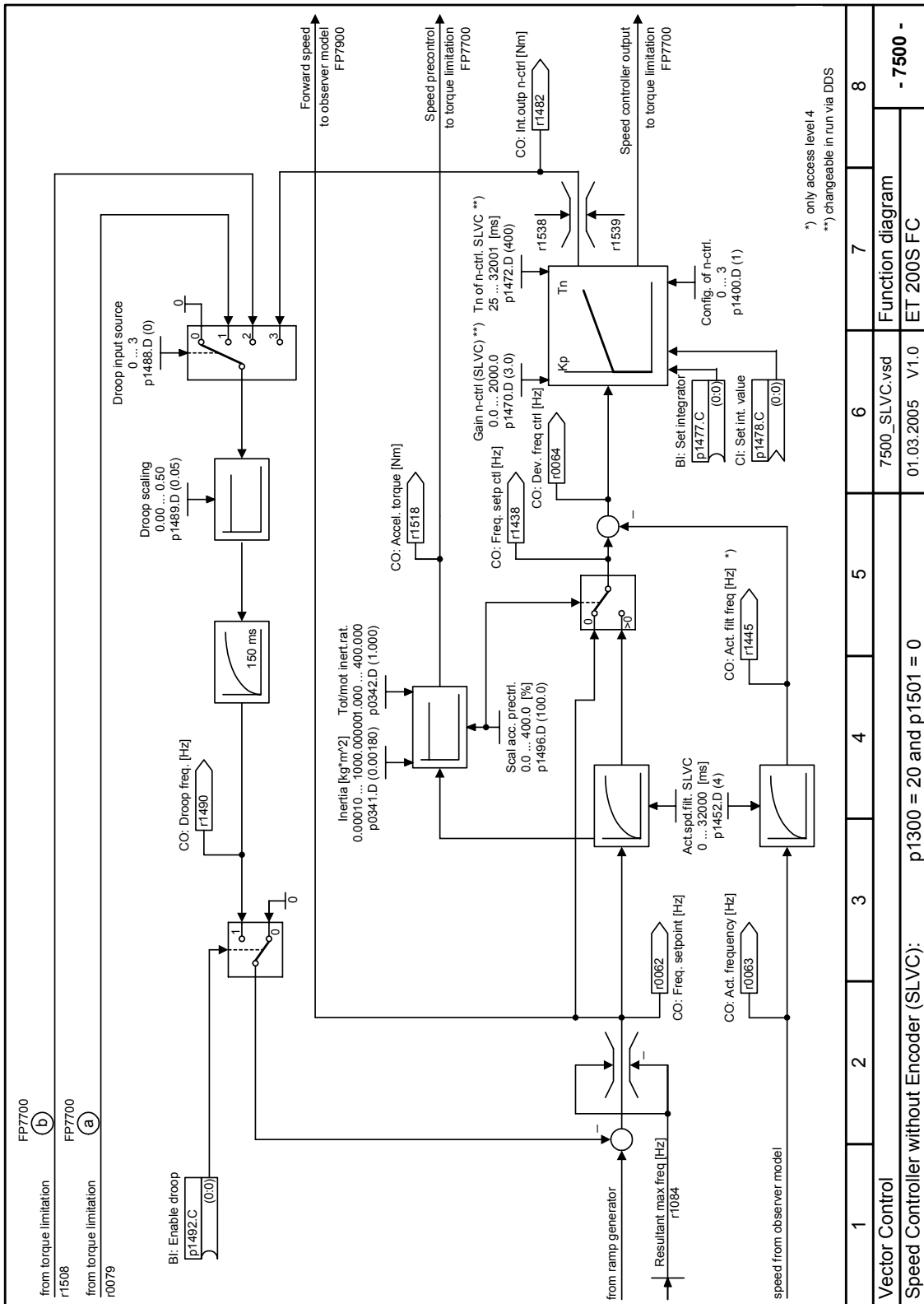




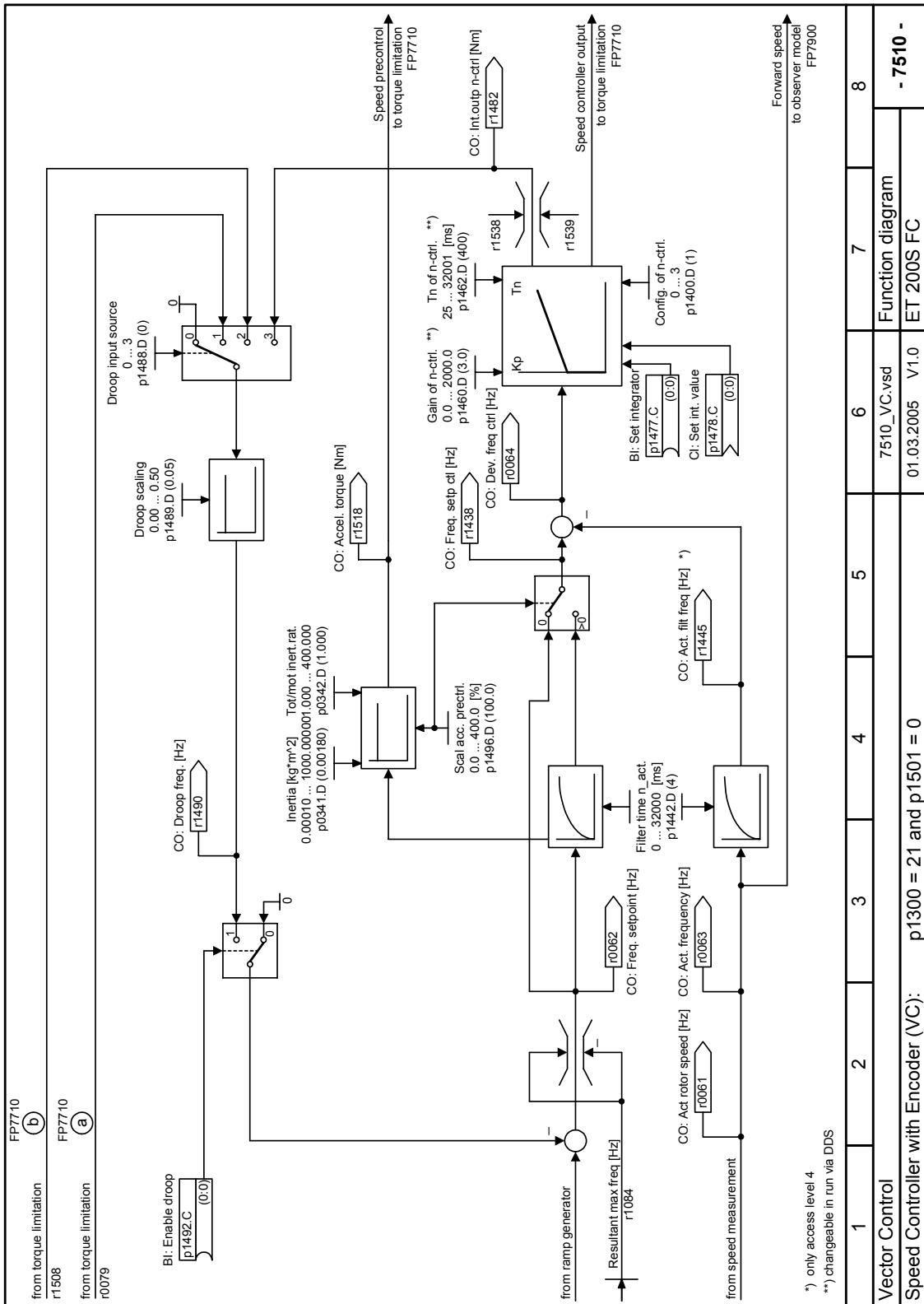


1	2	3	4	5	6	7	8
Vector Control							
Overview of Torque Control without Encoder: p1300 = 22 or p1300 = 20 and p1501 = 1							
7200.vsd						Function diagram	
01.03.2005 V1.0						ET 200S FC	
						- 7200 -	



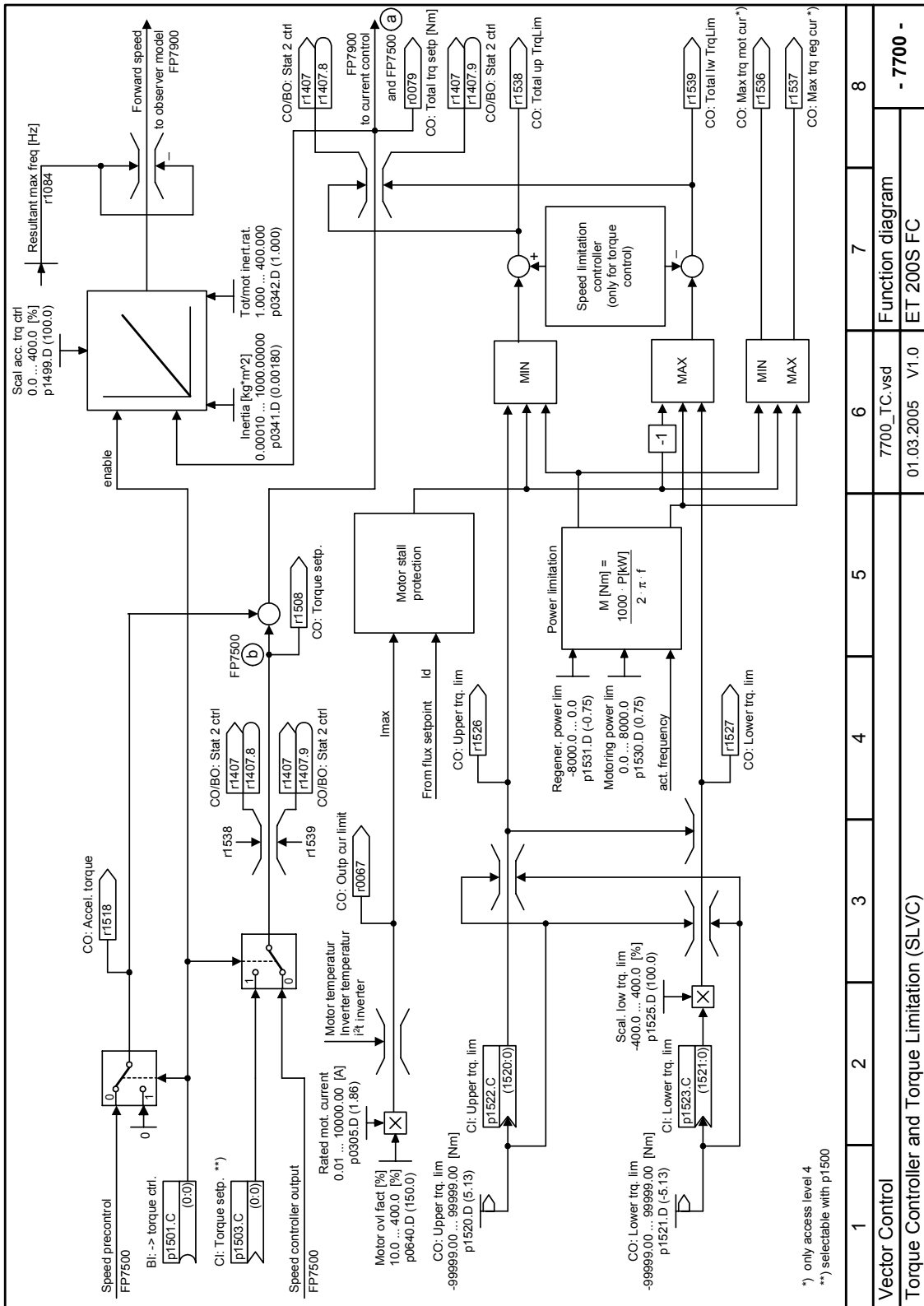


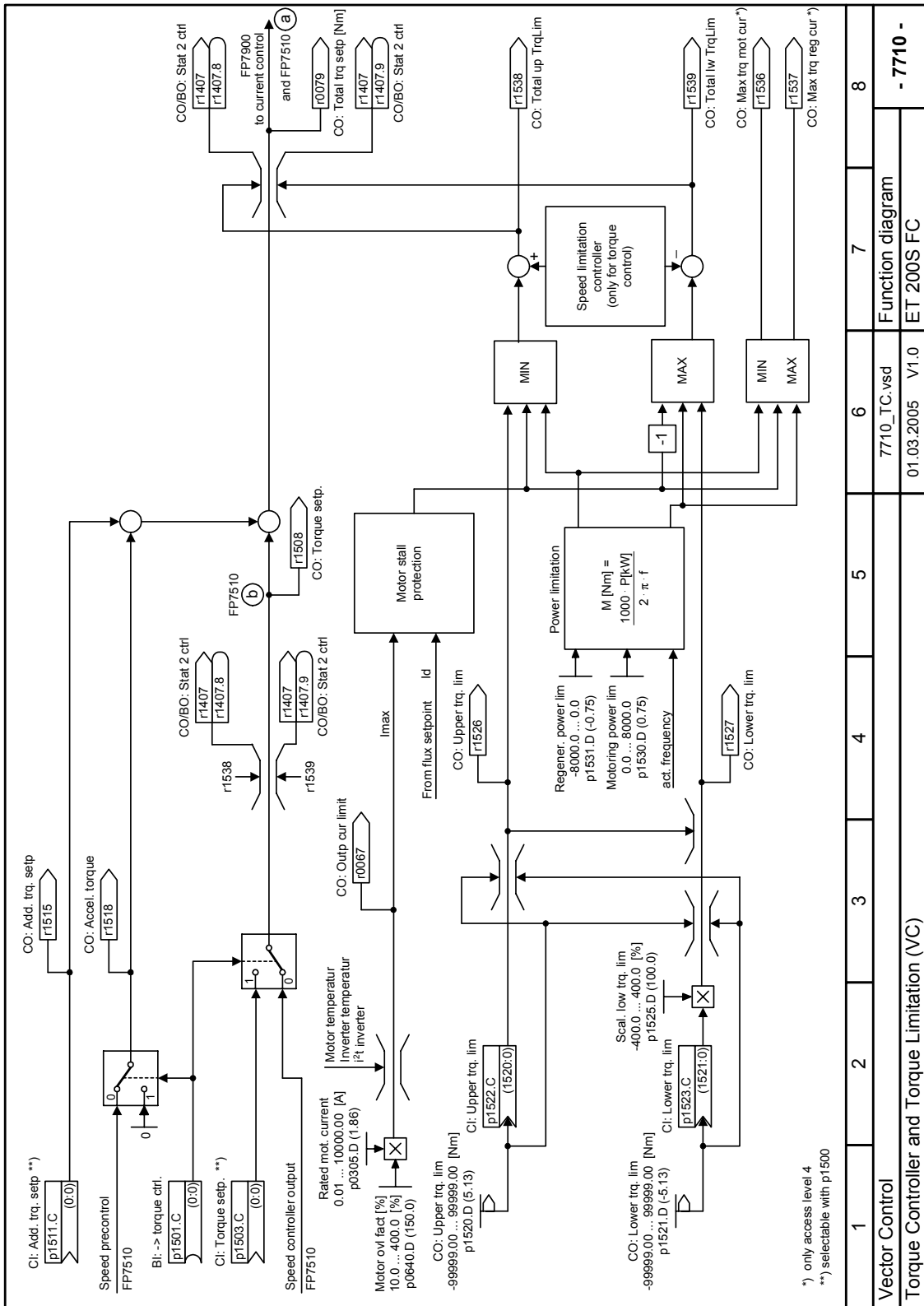
*) only access level 4
 **) changeable in run via DDS

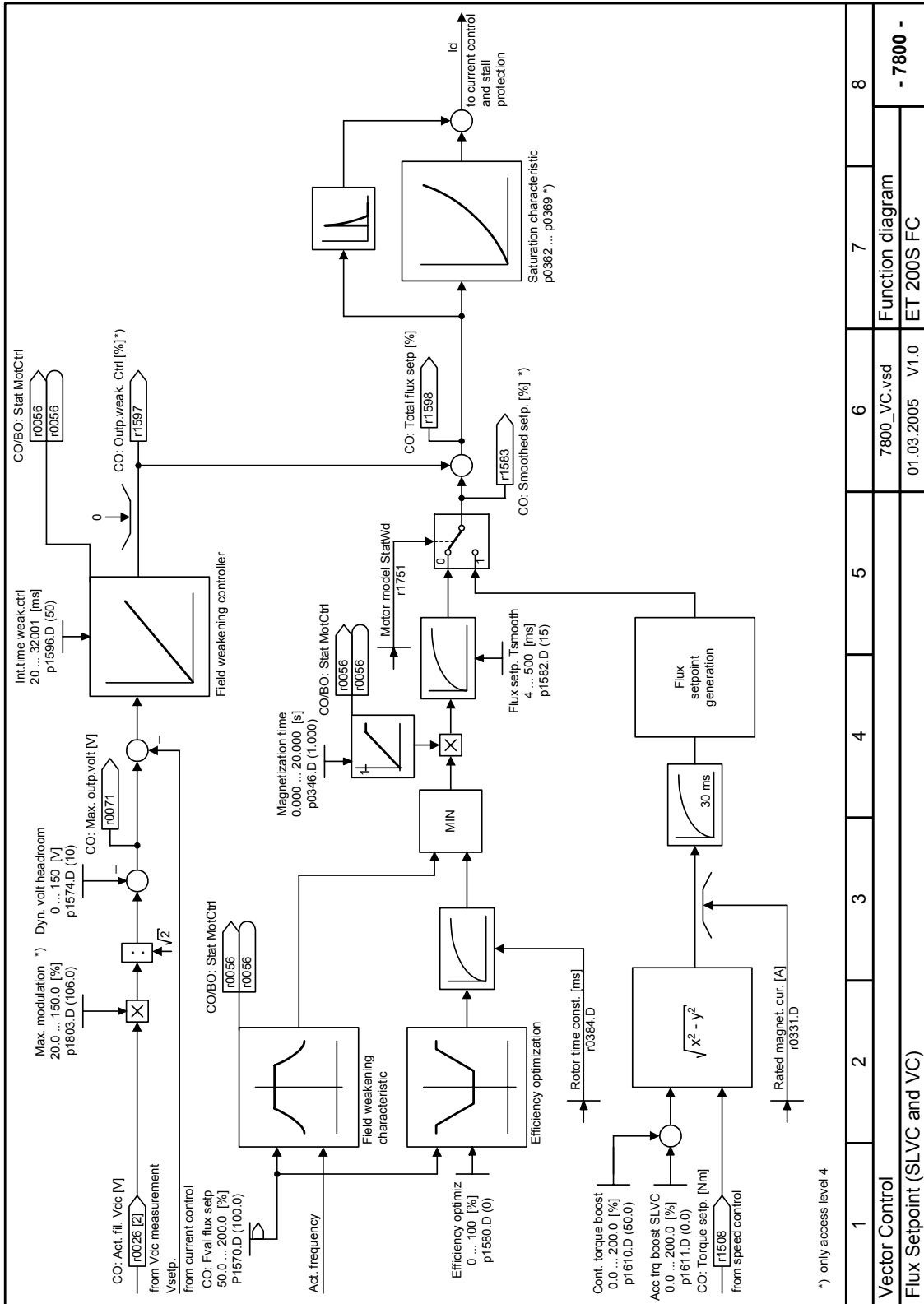


*) only access level 4
 **) changeable in run via DDS

1	2	3	4	5	6	7	8
Vector Control							
Speed Controller with Encoder (VC): p1300 = 21 and p1501 = 0							
						7510_VC.vsd	Function diagram
						01.03.2005	ET 200S FC
						V1.0	- 7510 -

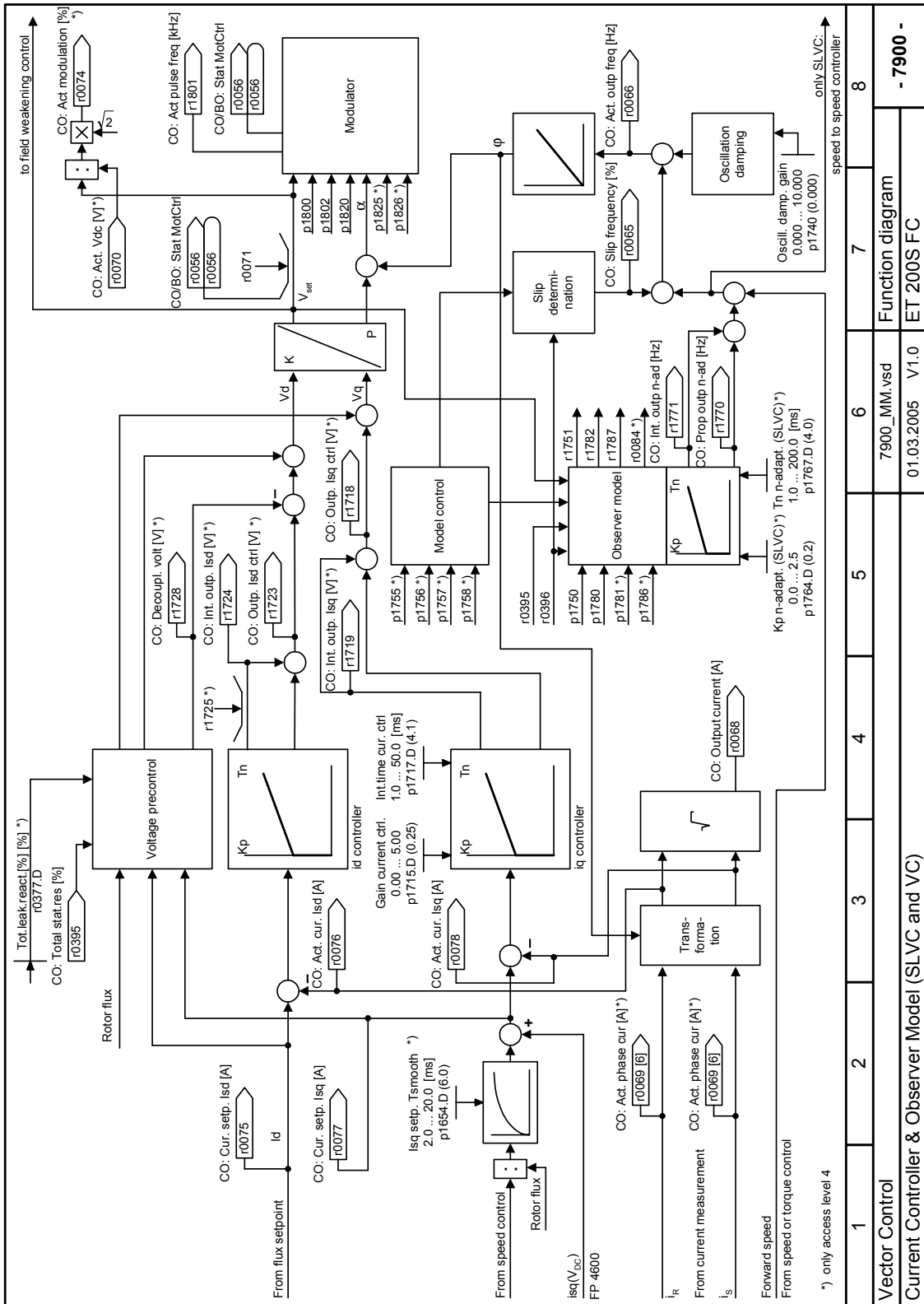




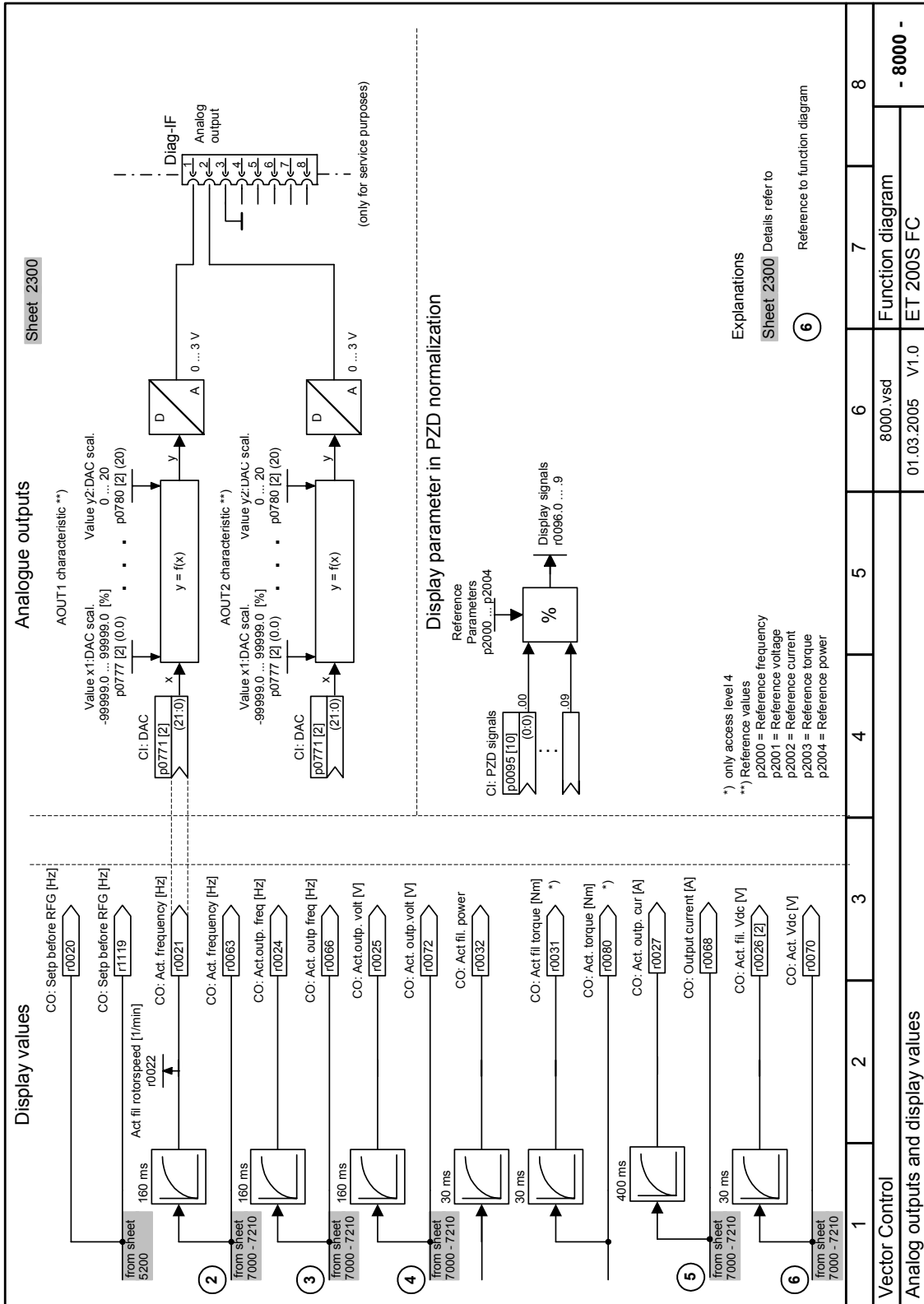


*) only access level 4

1	2	3	4	5	6	7	8
Vector Control							
Flux Setpoint (SLVC and VC)							
					7800_VC.vsd	Function diagram	
					01.03.2005	ET 200S FC	
					V1.0	- 7800 -	



1	2	3	4	5	6	7	8
Vector Control							
Current Controller & Observer Model (SLVC and VC)							
7900_MM.vsd							
Function diagram							
ET 200S FC							
01.03.2005 V1.0							
- 7900 -							



Faults and Alarms

3.1 Fault messages

Overview

In case of a fault, the inverter switches off and a fault is displayed. Switching on will not be possible until the fault has been acknowledged.

There are different possibilities to acknowledge a fault:

- Power Cycle (24 V)
- via Control Word 1, Bit 07
- via FB100, Parameter „CTRL“. With a double rising edge it is possible to quit all active faults.

Note

Fault messages are stored in r0947 with the code number (e.g. F0003 = 3). The corresponding fault value can be found in r0949. For faults without a fault value 0 is displayed. The time when a fault occurred is stored in r0948, the number of the faults stored in r0947 can be found in P0952.

Some safety faults need specific modes to be acknowledged. These are described with the relevant faults.

F0001 Overcurrent STOP_II**Cause**

- Motor power (p0307) does not correspond to the inverter power (r0206)
- Motor lead short circuit
- Earth faults

Diagnosis & Remedy

Check the following:

- Motor power (p0307) must correspond to inverter power (r0206).
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (p0350) must be correct
- Motor must not be obstructed or overloaded
- Increase Ramp-up time (p1120)
- Reduce Starting boost level (p1312)

F0002 Overvoltage STOP_II**Cause**

- Main supply voltage too high
- Motor is in regenerative mode

NOTE

Regenerative mode can be caused by fast ramp downs or if the motor is driven by an active load.

Diagnosis & Remedy

Check the following:

- Supply voltage must lie within limits indicated on rating plate.
 - Ramp-down time (p1121) must match inertia of load.
 - Required braking power must lie within specified limits.
- Higher inertia requires longer ramp times; otherwise, apply braking resistor.

NOTE

Higher inertia requires longer ramp times.

F0003 Undervoltage STOP_II**Cause**

- Main supply failed.
- Shock load outside specified limits.

Diagnosis & Remedy

Check Supply voltage.

F0004 Inverter Over Temperature STOP_II**Cause**

- Inverter overloaded
- Ventilation inadequate
- Pulse frequency too high
- Ambient temperature too high
- Fan inoperative

Diagnosis & Remedy

Check the following:

- Load or load duty cycle too high?
- Motor power (p0307) must match inverter power (r0206)
- Pulse frequency must be set to default value
- Ambient temperature too high?
- Fan must turn when inverter is running

F0005 Inverter I2T STOP_II**Cause**

- Inverter overloaded.
- Duty cycle too demanding.
- Motor power (p0307) exceeds inverter power capability (r0206).

Diagnosis & Remedy

Check the following:

- Load duty cycle must lie within specified limits.
- Motor power (p0307) must match inverter power (r0206)

F0011 Motor Over Temperature STOP_II**Cause**

Motor overloaded

Diagnosis & Remedy

Check the following:

- Load or load duty cycle too high?
- Motor nominal overtemperatures (p0626-p0628) must be correct
- Motor temperature warning level (p0604) must match

F0015 Motor temperature signal lost STOP_II**Cause**

Open or short circuit of motor temperature sensor. If signal loss is detected, temperature monitoring switches over to monitoring with the motor thermal model.

Diagnosis & Remedy

Check the following:

- the connection of the motor temperature sensor to the control unit
- the setting of p0601

F0020 Mains Phase Missing STOP_II**Cause**

Fault occurs if one of the three input phases are missed and the pulses are enabled and drive is loaded

Diagnosis & Remedy

Check the input wiring of the mains phases

F0022 Powerstack fault STOP_II**Cause**

This hardware fault caused by the following events:

- DC-link overcurrent = short circuit of IGBT

Diagnosis & Remedy

Contact Service Department.
Change inverter power module

F0023 Output phase fault STOP_II**Cause**

One output phase is disconnected.

Diagnosis & Remedy

Check motor connection.

F0025	Dclink Ripple	STOP_II
	<p>Cause Large ripples on the dclink.</p> <p>Diagnosis & Remedy Contact Service Department.</p>	
F0026	Supply to Gate Driver Not Enabled	STOP_II
	<p>Cause Synchronization error of the safety state machines.</p> <p>Diagnosis & Remedy Contact Service Department.</p>	
F0027	Overcurrent on W phase	STOP_II
	<p>Cause This hardware fault caused by the following events: - Over current trip on W phase - Earth Fault</p> <p>Diagnosis & Remedy Check Inverter and Motor wiring</p>	
F0028	Power limit exceeded during regeneration	STOP_II
	<p>Cause Occurs if motor is driven by an active load, causing motor to go into excessive regeneration. Occurs at very high load inertias, when ramping down.</p> <p>Diagnosis & Remedy - Reduce regeneration from active load - Reduce ramp down rate - Increase I_{max} regeneration limit in p1253</p>	
F0035	Auto restart after n	STOP_II
	<p>Cause Auto restart attempts exceed value of p1211.</p>	

F0041 Motor Data Identification Failure STOP_II**Cause**

Motor data identification failed.

- r0949 = 0: Load missing
 - r0949 = 1: Current limit level reached during identification.
 - r0949 = 2: Identified stator resistance less than 0.1% or greater than 100%.
 - r0949 = 3: Identified rotor resistance less than 0.1% or greater than 100%.
 - r0949 = 4: Identified stator reactance less than 50% and greater than 500%
 - r0949 = 5: Identified main reactance less than 50% and greater than 500%
 - r0949 = 6: Identified rotor time constant less than 10ms or greater than 5s
 - r0949 = 7: Identified total leakage reactance less than 5% and greater than 50%
 - r0949 = 8: Identified stator leakage reactance less than 25% and greater than 250%
 - r0949 = 9: Identified rotor leakage inductance less than 25% and greater than 250%
 - r0949 = 20: Identified IGBT on-voltage less than 0.5 or greater than 10V
 - r0949 = 30: Current controller at voltage limit
 - r0949 = 40: Inconsistence of identified data set, at least one identification failed
- Percentage values based on the impedance $Z_b = V_{mot,nom} / \sqrt{3} / I_{mot,nom}$

Diagnosis & Remedy

Check the following:

- r0949 = 0: is the motor connected to the inverter.
- r0949 = 1-40: are the motor data in p0304 p0311 correct.
- Check what type of motor wiring is required (star, delta).

F0042 Speed Control Optimisation Failure STOP_II**Cause**

Motor data identification failed.

- r0949 = 0: Time out waiting for stable speed
- r0949 = 1: Inconsistent readings

Diagnosis & Remedy

Make sure motor has data been entered correctly.
Motor data identification needs to have been done.

F0051 Parameter EEPROM Fault STOP_II**Cause**

Read or write failure while access to EEPROM.

Diagnosis & Remedy

- Factory Reset and new parameterization
- if necessary change control unit (ICU24(F))
- Contact Service Department.

F0052 power stack Fault STOP_II**Cause**

Read failure for power stack information or invalid data.

Diagnosis & Remedy

- Check connection between inverter power module and inverter control unit
- Powercycle inverter Control Unit.
- Change inverter Power Module.
- Change inverter Control Unit.

F0060 Asic Timeout STOP_II**Cause**

Internal communications failure

Diagnosis & Remedy

Check connection between inverter power module and inverter control unit

Fault appears sporadically:

- Communication failure due to EMC problems
- Check and if necessary improve EMC
- Use EMC filter

Fault appears immediately when mains voltage is applied and an ON command is given.

- If fault persists, change inverter.
- Contact Service Department.

F0061 Par Cl. MMC-PS not fitted Fault STOP_II**Cause**

MMC-PS Cloning Failed.

- r0949 = 0: MMC-PS Not Connected or incorrect MMC-PS Type
- r0949 = 1: Error while copying, possible corruption of Data on MMC-PS.
- r0949 = 2: File was not found, or in incorrect directory.

Diagnosis & Remedy

- r0949 = 0: Use MMC-PS with FAT12 or FAT16 format or correct MMC-PS Type, or fit an MMC-PS to Drive.
- r0949 = 1: Recopy the data.
- r0949 = 2: Put the correct named file in the correct directory /USER/SINAMICS/DATA.

F0062 Par Cl. MMC-PS contents invalid STOP_II**Cause**

File exists but the contents are not valid Control Word Corruption.

Diagnosis & Remedy

Recopy and ensure operation completes.

F0063 Par Cl. MMC-PS contents incompatible STOP_II**Cause**

File exists but was not the correct drive type.

Diagnosis & Remedy

Ensure clone from compatible drive type.

F0070 PLC setpoint fault STOP_II**Cause**

No setpoint values from PLC during telegram off time

Diagnosis & Remedy

- Check and improve if necessary the value in p2040
- Acknowledge fault
- Contact Service Department.
- if fault persists, change inverter control unit

F0071 USS setpoint fault STOP_II**Cause**

No setpoint values from USS during telegram off time

Diagnosis & Remedy

Check and if necessary improve the monitoring time in the STARTER SW while getting the command source.
Check USS master

F0075 No communication with PLC STOP_II**Cause**

- No communication with PLC.

NOTE

this fault can happen when switching on the control unit. Quit fault.

Diagnosis & Remedy

- Check fieldbus connection.
- Switch on PLC.
 - CPU of PLC in stop mode?
 - Evaluate the diagnostic information of bus slaves
 - Check HW config, Profibus configuration, resp. ET 200S configuration
 - Cycle time for FB100 < p8451?
 - Is the FB100 provided with correct interface values?

F0085 External Fault STOP_II**Cause**

External fault triggered via command input, see p2106.

Diagnosis & Remedy

- Check P2106.

F0090 Encoder feedback loss STOP_II**Cause**

Signal from Encoder lost (check fault value r0949):

- r0949 = 0: Encoder signal lost.
- r0949 = 1: Encoder loss detected due to sudden speed change (i.e. speed change detected on encoder in a single scan > value in P0492)
- r0949 = 2: Encoder loss detected at low speed (a torque limit has happened and encoder speed measures 0 for time > P0494 whilst speed setpoint is > 0).
- r0949 = 5: Encoder not configured in p0400, but required for sensed control (p1300 = 21 or 23).
- r0949 = 6: Encoder module not found, but configured in p0400.

Diagnosis & Remedy

Stop the inverter.

If encoder fitted and

- r0949 = 5: Select encoder type via p0400.
- r0949 = 6: Check connections between encoder module and inverter.
- r0949 = 0: Check that encoder not faulty (select p1300 = 0, run at fixed speed, check encoder feedback signal in r0061).
- r0949 = 1: Check that encoder not faulty (select p1300 = 0, run at fixed speed, check encoder feedback signal in r0061). Increase encoder loss threshold in p0492.
- r0949 = 2: Check that encoder not faulty (select p1300 = 0, run at fixed speed, check encoder feedback signal in r0061). Increase encoder loss delay in p0494.
- Check connections between motor and inverter.

If encoder not fitted and

- r0949 = 5: Select SLVC mode (p1300 = 20 or 22).
- r0949 = 6, set p0400 = 0.

F0100 Watchdog Reset STOP_II**Cause**

Software Error

Diagnosis & Remedy

Contact Service Department.
Change inverter control unit.

F0101 Stack Overflow STOP_II**Cause**

Software error or processor failure.

Diagnosis & Remedy

Contact Service Department.
Change inverter control unit

F0396 Safety enable via PLC and via Parameterset don't match STOP_II**Cause**

p8456 Bit 2 does not match p9601/p9801. Parameter p8456 is the stored value, which gets sent by the PLC.

Diagnosis & Remedy

To enable safety p9601 and p9801 must be set and in the PLC program (properties of the ICUF) safety has to be enabled.

To disable Safety p9601 and p9801 must be reset and the PLC program (properties of the ICUF) safety has to be disabled.

NOTE

This fault can only be acknowledged by power cycle (24 V) if the settings in ICU24(F) comply with the settings in SIMATIC-Manager.

F0397 The SLOT_ID from the PLC does not match the stored one STOP_II**Cause**

Slot id given from the ET200S PLC does not match the stored Slot ID Parameter (p8455).

Diagnosis & Remedy

- Change Slot ID in PLC Program or in the Inverter control unit (p8455) and safe to MMC-PS if required
- Change Slot ID by parameter access, back to default condition -1 (only possible when p8457 = 1)

NOTE

Fault needs power cycle (24 V) to be acknowledged. After Power Cycle same fault may still be present, if the Slot ID has not been changed.

F0398 The PMMC Bit 0 (MMC-PS required) from the PLC does not match the stored one STOP_II**Cause**

PMMC Bit 0 given from the ET200S PLC does not match the stored PMMC Parameter (p8456.0).

Diagnosis & Remedy

Parameter will be automatically changed after received from PLC.

NOTE

Fault needs power cycle (24 V) to be acknowledged.

F0399 Hot Swap was not accepted STOP_II**Cause**

A Hotswap of either the Control Unit or the Powerstack has been taken place which is not allowed. By default only Powerstack Hotswaps are allowed during runtime, for details refer to Operating Instructions "Commissioning and Operation".

Diagnosis & Remedy

- Change the Control Word p7840 to 33 to override the hotswap control. Afterwards change it back to 1 to prevent damage due to unauthorised hotswaps.

NOTE

Fault needs power cycle (24 V) to be acknowledged.

F0452 Belt Failure STOP_II**Cause**

Load conditions on motor indicate belt failure or mechanical fault.

Diagnosis & Remedy

Check the following:

1. No breakage, seizure or obstruction of drive train.
2. If using an external speed sensor, check the following parameters for correct function:
 - p2192 (delay time for permitted deviation)
3. If using the torque envelope, check parameters:
 - p2182 (threshold frequency f1)
 - p2183 (threshold frequency f2)
 - p2184 (threshold frequency f3)
 - p2185 (upper torque threshold 1)
 - p2186 (lower torque threshold 1)
 - p2187 (upper torque threshold 2)
 - p2188 (lower torque threshold 2)
 - p2189 (upper torque threshold 3)
 - p2190 (lower torque threshold 3)
 - p2192 (delay time for permitted deviation)
4. Apply lubrication if required.

F0453 Motor Stalled STOP_II**Cause**

1. In SLVC or VC (p1300 greater than 20) and Ramp rate too fast
2. In SLVC or VC (p1300 greater than 20) and done OFF2 and RUN onto a spinning motor without Flying start enabled
3. In SLVC or VC (p1300 greater than 20) and no motor connected or motor too small for inverter
4. In SLVC (p1300 = 20 or 21) and load too large at very low frequency

Diagnosis & Remedy

1. Reduce ramp rate in p1120
2. Enable flying start (p1200 equal to 1)
3. Connect motor or use larger motor for this inverter or use VF mode (p1300 less than 20).
4. Increase boost in p1611

F1600 SH with drive fault from safety hardware STOP_II**Cause**

A safe standstill (SH) has been initiated by hardware due to a drive fault:

- r0949 = 33: SH acknowledge after a drive fault requires the OFF first and then an acknowledge (ACK) to remove the safety fault! If however ACK is given first and then the OFF command, the SH is still active.
- r0949 = 100: The safety rails for the SH signal are not consistent on P1.
 - The fault can happen in combination with F1601.0 or F1601.1 when a processor does not have the correct safety settings after a reset.
 - When the safety rails have been switched at a very high rate, a signal consistency may be detected. In spite of a short hardware filter time and an additional debounce time, both processors might read different signal levels from the safety rails and therefore detect a fault.
- r0949 = 101: Maximum speed exceeded on P1 during activation of the SH. The estimated speed deviates from the SBR monitoring ramp. When the drive is in VECTOR mode (with p1300 > 19):
 - Increase p9691 and p9891 for a larger tolerance or run the motor identification (MotID, see p1910) again for better tuning of the observer and controllers.
 - Increase the ramping times (p1120, p1121) so that deviation between reference and actual frequency is minimized.

- r0949 = 102: Maximum speed exceeded on P1 during activation of SG. The estimated speed deviates from the SBR monitoring ramp.
 - Increase the ramping times (p1120, p1121) so that deviation between reference and actual frequency is minimized.
 - When the drive is in VECTOR mode (with p1300 > 19), increase p9691 and p9891 for a larger tolerance or run the motor identification (MotID, see p1910) again for better tuning of the observer and controllers.
- r0949 = 103: Communication timeout of processor P1 during forced dynamisation. The handshaking via hardware lines has failed.
- r0949 = 104: Communication timeout of processor P2 during forced dynamisation. The handshaking via hardware lines has failed.
- r0949 = 105: Acknowledge error on P1 when trying to leave the SH due to a drive fault.
- r0949 = 106: Error in the mechanical brake or in the brake feedback path of P1.
- r0949 = 107: Error in the gate driver or feedback path of P1. Can happen when either the hardware measurement circuit on the IPM is faulty or when P1 and P2 are not synchronised.
- r0949 = 108: Signal debounce error on P1.
- r0949 = 109: Hardware detection fault on P1. The hardware type (ICU24 or ICU24F) has not been recognised correctly.
- r0949 = 200: The SH signal bars are not consistent on P2. Avoid fast periodic activation and deactivation of the SH.
- r0949 = 201: Maximum speed exceeded on activation of SH on P2.
- r0949 = 202: Maximum speed exceeded on activation of SG in P2.
- r0949 = 203: Communication timeout of processor P1 as seen from P2. The handshaking via hardware lines has failed.
- r0949 = 204: Communication timeout of processor P2 during forced dynamisation. The handshaking via hardware lines has failed.
- r0949 = 205: Acknowledge error when leaving the SH due to a drive fault on P2.
- r0949 = 206: Missing pulse disable from P1 while P2 is in SH state. Can be due to a deviation in the synchronisation between P1 and P2 with a short SBR ramp. Try to increase p9681/p9881.
- r0949 = 207: Error in gate driver or feedback path on P2.
- r0949 = 208: Debounce error on P2.
- r0949 = 209: Hardware type could not be detected correctly on P2.

Diagnosis & Remedy

- Reconnect the safety rails to 24V on the PM DF-X1 or deselect the safety rails on a PM DF PROFIsafe, then activate an OFF command (OFF1, OFF2 or OFF3) and acknowledge the safety fault.
- r0949 = 100, 101, 200 or 201: Increase the ramping times p1120/p1121 or increase the safety tolerance p9691/p9891, check the motor parameters (p0394 p0311) or when vector mode is selected (p1300 > 19) run the motor identification (see p1910) again.
- r0949 = 100, 108, 200 or 208: Decrease the rate of switching the SH or SG rails or increase the cycle time of the PLC.
- r0949 = 206: Increase the SBR ramping time in p9681/p9881.

F1601 System startup error**STOP_II****Cause**

System startup error. Error during the startup initialisation after a PowerCycle or HotSwap.

This error is critical and cannot be acknowledged. A restart (hotswap or power cycle) of the drive is required!

- r0949 = 0: Handshaking error on P1. Either an unexpected reboot by P1 or a synchronisation error during startup. Please power-cycle the control unit again or perform a hotswap.
- r0949 = 1: Handshaking error on P2. Either a faulty reboot by P2 or a synchronisation error during startup. Please power-cycle the control unit or perform a hotswap.
- r0949 = 100: Version error detected by P1. The safety version number is not identical on P1 and P2.
- r0949 = 101: Startup semaphore is wrong on P1. Can happen if commissioning was not finished properly before performing a power cycle. There might also be a problem of the EEPROM.
- r0949 = 102: Error with semaphore on P1. The drive loads default parameters instead of the user settings.
- r0949 = 103: Error with initial and first hardware type detection on P1. The hardware type (ICU24 or ICU24F) could not be identified. Either the control board is faulty or the detection is affected by EMC.
- r0949 = 104: Timeout error on P1 while waiting for communication with P2.
 - The backplane bus might not be working which prevents the communication with P1.
Check if the upper 8 plugs of the ICU are correctly plugged into the sockets.
Check if the backplane bus terminator is set correctly. If not, the communication with the PLC will not work, preventing the P2 to communicate with P1.
 - An error can also occur when P2 is not running.
Possibly caused by defective hardware, wrong software or no software.
- r0949 = 105: Error on P1 during hardware exchange phase. Processors have not agreed on same type of hardware platform.
- r0949 = 106: Timeout error on P1 in hardware detection state. Handshaking with P2 failed.
- r0949 = 107: Checksum error on P1. The safety parameters are not consistent in EEPROM.
- r0949 = 108: Error on P1 during parameter transfer to P2. The correct safety parameters are not available on P2 due to a communication problem.
- r0949 = 109: Timeout error on P1 during parameter transfer to P2 due to different safety checksums on P1 and P2. The parameter transfer to P2 has failed.
- r0949 = 110: Timeout error on P1 during forced dynamisation and processor self test.
- r0949 = 111: Timeout error on P1 when leaving the safety commissioning at startup.
- r0949 = 112: Checksum error on P1 during processor initialisation.
- r0949 = 200: Version error detected by P2. The safety version number (see r9770) is not identical on P1 and P2.
- r0949 = 201: Startup semaphore is wrong on P2. Can happen if commissioning was not finished properly before performing a power cycle. There might also be a problem of the EEPROM.
- r0949 = 202: Error with semaphore on P2. The drive loads default parameters instead of the user settings.
- r0949 = 203: Error on P2 with initial and first hardware detection. The hardware type (ICU24 or ICU24F) could not be identified. Either the control board is faulty or affected by EMC.
- r0949 = 204: Timeout error on P1 while waiting for communication with P2.
- r0949 = 205: Error on P1 during hardware exchange phase. Processors have not agreed on same type of hardware platform.
- r0949 = 206: Timeout error on P2 during hardware detection. Handshaking with P1 failed.
- r0949 = 207: Checksum error on P2. The safety parameters on P2 are not consistent.
- r0949 = 208: Error on P2 during parameter transfer from P1. The safety parameters on P2 are not valid due to a communication problem.
- r0949 = 209: Timeout error on P2 during parameter transfer from P1. Possibly due to different checksums on P1 and P2.
- r0949 = 210: Timeout error on P2 in startup dynamisation phase. The communication failed.
- r0949 = 211: Timeout error on P2 when leaving the initial safety commissioning.
- r0949 = 212: Checksum error on P2 during processor initialisation.

Diagnosis & Remedy

- Power-cycle ICU (since fault F1601 cannot be acknowledged).
- Make sure that ICU is connected correctly to IPM and the terminal module.
- Check backplane bus termination (see rightmost or last terminal module).
- Reduce EMC.

F1610 Startup error EEPROM data inconsistent STOP_II**Cause**

EEPROM data inconsistency error:

- r0949 = 100: Safety parameters have not been written correctly to EEPROM on P1. Try to load parameters again.
- r0949 = 200: EEPROM data inconsistency error on P2.
- r0949 = 2011: Safety parameters have not been written correctly to EEPROM.

Diagnosis & Remedy

Load safety parameters again.

F1611 Defect in cross data comparison STOP_II**Cause**

Data exchange error between processors:

- r0949 = 100: P2 has entered the safe standstill due to a drive fault but no fault was detected on P1.
- r0949 = 102: Dynamic checksums are different on P1. Cross comparison fault or problem with processor communication.
- r0949 = 103: Derived frequency is different on both processors. Cross comparison fault or problem with processor communication.
- r0949 = 104: Frequency calculation error on P1 (see also F1614).
- r0949 = 201: Frequency check resulted in error on P2.
- r0949 = 202: Dynamic checksums are different on P2. Cross comparison fault or problem with processor communication.

Diagnosis & Remedy

- Clear the safety fault: Reconnect the safety rails to 24V on a PM DF-X1 or deselect the safety rails on a PM DF PROFIsafe, then activate an OFF command (OFF1, OFF2 or OFF3) and acknowledge the safety fault.
- Reduce EMC.
- Perform a forced dynamisation
- If the fault occurs repeatedly, exchange the ICU.

F1612 Difference in safety hardware detection STOP_II**Cause**

The hardware (ICU24 or ICU24F) could not be identified.

- r0949 = 100: Identification error during startup on P1.
- r0949 = 101: Runtime detection error on P1.
- r0949 = 102: Hardware or software configuration error on P1.
- r0949 = 200: Startup error on P2.
- r0949 = 201: Runtime detection error on P2.
- r0949 = 202: Hardware or software configuration error on P2.

Diagnosis & Remedy

- ICU24F hardware is faulty or there is a problem in the processor communication. Perform a power cycle.

F1613 Maximum speed exceeded STOP_II**Cause**

The maximum speed has been exceeded.

- r0949 = 100: Speed error on P1, maximum speed exceeded.
- r0949 = 200: Maximum speed exceeded on P2.

Diagnosis & Remedy

- Check application or increase safety threshold p9691/p9891.
- See also remedies for F1614.

F1614 Error in speed consistency STOP_II**Cause**

Error in speed detection of the speed estimation circuit (VFM module):

- r0949 = 100: Difference in speed comparison on P1.
- r0949 = 101: VFM estimated frequency too high on P1.
- r0949 = 102: VFM estimated frequency too low on P1.
- r0949 = 103: Estimated frequency of VFM module was not detected on P1.
- r0949 = 104: Error in cycle-time on P1.
- r0949 = 200: Speed deviation on P2.
- r0949 = 201: VFM estimated frequency too high on P2.
- r0949 = 202: VFM estimated frequency too low on P2.
- r0949 = 203: Estimated VFM frequency was not detected on P2.
- r0949 = 204: Error in cycle-time on P2.

Error can occur with small ramping times. When the VC or SLVC mode is configured (see p1300) the cause can be the same as for fault F0453.

Diagnosis & Remedy

- Increase ramping times p1120 and p1121.
- Make sure that drive is not at current limit when starting.
- See remedies for F0453.
- Contact Service Department.

F1615 Error in ICU supply voltage STOP_II**Cause**

- r0949 = 100: Error in supply voltage 3.3V or 24V on the control board (ICU).

Diagnosis & Remedy

- Check supply voltage.
- Reduce EMC.

F1616 Error in processor self-test STOP_II**Cause**

The processor selftest has uncovered an error:

- r0949 = 100: General error on P1.
- r0949 = 101: Error in RAM test on P1.
- r0949 = 102: Error in ROM test on P1.
- r0949 = 103: Error in processor function test on P1.
- r0949 = 200: Error in processor self-test on P2.

The selftest is started together with the forced dynamisation and must be enabled by setting p9601.1 and p9801.1.

Diagnosis & Remedy

- Run self-test again (set Bit01.1 in p9601 and p9801.1 and enter the SH mode by selecting the safety rails accordingly).
- Power cycle (24 V)
- Change Drive Control Unit

F1625 Consecutive counter incorrect STOP_II**Cause**

The consecutive counter checks the consistency of the communication between P1 and P2:

- r0949 = 100: The consecutive monitoring counter has an error on P1.
- r0949 = 101: Processors are out of synchronism.
- r0949 = 102: Processor communication has failed.
- r0949 = 103: Processor communication has failed or processors are out of synchronism.
- r0949 = 200: The consecutive counter has an error on P2.

Diagnosis & Remedy

- Acknowledge safety fault.
- Restart ICU or check EMC levels in case of accumulated faults.

F1630 Driver for mechanical brake is faulty STOP_II**Cause**

An error has been detected with the mechanical brake feedback.

- r0949 = 0: Problem with the mechanical brake.

Diagnosis & Remedy

- Exchange brake module.

F1649 Internal software error STOP_II**Cause**

- r0949 = 1: Buffer overflow on checksum calculation for P1 parameter access functions.
- r0949 = 2: Buffer overflow on checksum calculation for P2 parameter access functions.
- r0949 = 3: Endless safety loop on P1.
- r0949 = 4: Endless safety loop on P2.
- r0949 > 100: Signals an internal or unexpected software fault.
Only for Siemens internal diagnostics.

Diagnosis & Remedy

- Contact Service Department.

F1650 Fault in safety parametrisation STOP_II**Cause**

Error during startup or safety commissioning/reset:

- r0949 = 1: Checksum error during safety commissioning or safety reset.
- r0949 = 2: Error during internal parameter transfer.
- r0949 = 3: Error finalizing the buffer transfer.
- r0949 = 4: Failure during saving of parameters to EEPROM.
- r0949 = 5: Error in safety parameter transfer during safety reset.
- r0949 = 11: Communication channel between processors not ready.
- r0949 = 2000: Safety commissioning can only be finished by setting parameter p3900.

Diagnosis & Remedy

- Try leaving via p3900 = 11.
- Run the safety commissioning again.
- Try to perform a safety parameter reset.

F1655 Fault during processor reset STOP_II**Cause**

- r0949 = 100: Safety reset timeout on P1.
- r0949 = 200: Safety reset timeout on P2.

Diagnosis & Remedy

- Retrigger the safety reset (perform a hot swap of the ICU).

F1659 Denial of parameter change STOP_II**Cause**

A write request for one or more safety parameters was rejected:

- r0949 = 0: Problem during finalization of safety parameters. Drive has reloaded the old data.
- r0949 = 1: Safety password not set correctly.
- r0949 = 2: Safety parameters cannot be reset since a safety mode (SH, SG, etc) is enabled.
- r0949 = 3: Tolerance too small (p9691 < p9690). Increase tolerance p9691!
- r0949 = 10: Attempt to enable SH but function not supported.
- r0949 = 11: Attempt to enable SG, but function not supported.
- r0949 = 203: Tolerance too small (p9891 < p9890). Increase tolerance!

Diagnosis & Remedy

- Acknowledge fault and enter safety commissioning again. If not possible, leave the safety commissioning with p3900 = 11 and operate the drive with the old safety settings..

F1660 Wrong safety checksum on leaving safety commissioning STOP_II**Cause**

- r0949 = 0: Attempt to leave safety commissioning with r9798 != p9799.
- r0949 = 1: Attempt to leave safety commissioning with r9898 != p9899.
- r0949 = 2: Attempt to leave safety commissioning with r9798 != r9898.

Diagnosis & Remedy

- Make sure that checksums in p9798 and p9898 are identical. If not, ensure that parametrisation is identical (p96xx = p98xx).
- Set checksum in p9799 or p9899 correctly.
- If setting the checksums not successful, leave safety commissioning via p3900 = 11 (cancel commissioning).

3.2 Alarms

A0501 Current Limit

Cause

- Motor power does not correspond to the inverter power
- Motor leads are too long
- Earth faults

Diagnosis & Remedy

Check the following:

- Motor power (p0307) must correspond to inverter power (r0206).
- Cable length limits must not be exceeded.
- Motor cable and motor must have no short-circuits or earth faults
- Motor parameters must match the motor in use
- Value of stator resistance (p0350) must be correct
- Motor must not be obstructed or overloaded
- Increase Ramp-up time (p1120)
- Reduce Starting boost level (p1312)

A0502 Overvoltage limit

Cause

Overvoltage limit is reached. This warning can occur during ramp down, if the Vdc controller is disabled (p1240 = 0).

Diagnosis & Remedy

If this warning is displayed permanently, check drive input voltage.

A0503 UnderVoltage Limit

Cause

- Main supply failed
- Main supply and consequently DC-link voltage (r0026) below specified limit.

Diagnosis & Remedy

Check main supply voltage.

A0504 Inverter OverTemperature

Cause

Warning level of inverter heat-sink temperature (p0614) is exceeded, resulting in pulse frequency reduction and/or output frequency reduction (depending on parameterization in p0610).

Diagnosis & Remedy

Check the following:

- Ambient temperature must lie within specified limits
- Load conditions and duty cycle must be appropriate
- Fan must turn when drive is running

A0505 Inverter I2T**Cause**

Warning level exceeded, current will be reduced if parameterized (p0610 = 1)

Diagnosis & Remedy

Check that duty cycle lies within specified limits.

A0506 Inverter duty cycle**Cause**

Difference between heatsink and IGBT junction temperature exceeds warning limits.

Diagnosis & Remedy

Check that duty cycle and shock loads lie within specified limits.

A0507 Inverter temp. signal lost**Cause**

Inverter temperature signal loss

Diagnosis & Remedy

Check the following:

- the connection of the motor temperature sensor to the control unit
- the setting of p0601

A0511 Motor OverTemperature I2T**Cause**

- Motor overloaded.
- Load duty cycle too high.

Diagnosis & Remedy

Independently of the kind of temperature determination check:

- p0604 motor temperature warning threshold
- p0625 motor ambient temperature

If p0601 = 0 or 1, check the following:

- Check if name plate data are correct? If not perform quick commissioning. Accurate equivalent circuit data can be found by performing motor identification (p1910=1).
- Check if motor weight (p0344) is reasonable. Change if necessary.
- Via p0626, p0627, p0628 the standard overtemperatures can be changed, if the motor is not a Siemens standard motor.

If p0601 = 2, Check the following:

- Check if temperature shown in r0035 is reasonable.
- Check if the sensor is a KTY84 (other sensors are not supported)

A0523 Output fault**Cause**

One phase of output is disconnected.

Diagnosis & Remedy

Check motor connection.

A0525 F3E Dclink Ripple**Cause**

Large dclink ripple

A0541 Motor Data Identification active**Cause**

Motor data identification (p1910) selected or running.

A0542 Speed Control Optimisation Active**Cause**

Speed Control Optimisation (p1960) is selected or running.

A0564 MMC Plugged During Operation**Cause**

MMC-PS Plugged during Operation but in HW Config (SIMATIC S7) "Startup without MMC-PS" is set. This possibly causes that the current data set will be overwritten with the next startup.

Diagnosis & Remedy

Remove MMC-PS from drive or set "Startup with MMC-PS" in HW Config and upload current parameter set to MMC-PS.

A0565 MMC Contents no longer equal EEPROM**Cause**

MMC-PS Contents no longer equal EEPROM. The drive was automatically started with the current contents of the MMC-PS Clone00.bin file. A parameter change has been performed on the EEPROM but not on the MMC-PS contents and therefore the EEPROM file differs from clone00.bin on the MMC-PS.

Diagnosis & Remedy

Reclone the contents of the EEPROM via p0010=30, p0802=2 with p0804=00.
Power cycle (24 V)

A0590 Encoder feedback loss warning**Cause**

Signal from Encoder lost; Inverter might have switched to sensorless vector control.

Check also alarm value r0949:

- r0949 = 0: Encoder signal lost.
- r0949 = 5: Encoder not configured in p0400, but required for sensed control (p1300 = 21 or 23).

Diagnosis & Remedy

Stop the inverter.

If encoder fitted:

- r0949 = 5: Select correct encoder type via p0400.
- r0949 = 0: Check that encoder not faulty (select p1300 = 0, run at fixed speed, check encoder feedback signal in r0061).

If encoder not fitted:

- r0949 = 5: Select SLVC mode (p1300 = 20 or 22).

A0600 RTOS Overrun Warning**Cause**

Internal time slice overrun

Diagnosis & Remedy

Contact Service Department.

A0700 PLC warning 1

Cause

The parameter or configuring settings by the PLC are invalid.

Diagnosis & Remedy

Check PLC configuration

A0702 PLC warning 3

Cause

Link to the PLC is interrupted.

Diagnosis & Remedy

Check link to PLC

A0703 PLC warning 4

Cause

No setpoints or invalid setpoints received from the PLC.

Diagnosis & Remedy

Check setpoints from PLC. Switch SIMATIC CPU to "RUN".

A0705 PLC warning 6

Cause

No actual send by the inverter.

Diagnosis & Remedy

Contact Service Department.

A0706 PLC warning 7

Cause

Software error

Diagnosis & Remedy

Contact Service Department.

A0710 Communication error

Cause

Communication with PLC is lost.

Diagnosis & Remedy

Contact Service Department.

A0711 PLC configuration error

Cause

PLC reports a configuration error.

Diagnosis & Remedy

Check PLC parameters

A0910 I-max controller de-activated**Cause**

Occurs

- If main supply voltage is permanently too high.
- If motor is driven by an active load, causing motor to go into regenerative mode.
- at very high load inertias, when ramping down.

Diagnosis & Remedy

Check the following:

- Input voltage must lie within range.
- Load must be match.

A0921 DAC parameters not set properly.**Cause**

DAC parameters (p0777 and p0779) should not be set to identical values, since this would produce illogical results.

Diagnosis & Remedy

Check the following:

- Parameter settings for output identical
- Parameter settings for input identical
- Parameter settings for output do not correspond to DAC type

Set p0777 and p0779 to different values.

A0922 No load applied to inverter**Cause**

No Load is applied to the inverter.

As a result, some functions may not work as under normal load conditions.

NOTE

if the motor holding brake is open and the motor supply voltage is disconnected, the motor holding brake stays open and the alarm A0922 will be displayed.

Diagnosis & Remedy

Check that motor is connected to inverter.

A0923 Both JOG Left and JOG Right are requested**Cause**

Both JOG right and JOG left (p1055/p1056) have been requested. This freezes the RFG output frequency at its current value.

Diagnosis & Remedy

Do not press JOG right and left simultaneously.

A0952 Belt Failure Detected**Cause**

Load conditions on motor indicate belt failure or mechanical fault.

Diagnosis & Remedy

Check the following:

1. No breakage, seizure or obstruction of drive train.
2. If using an external speed sensor, check the following parameters for correct function.
 - p2192 (delay time for permitted deviation)
3. If using the torque envelope, check parameters:
 - p2182 (threshold frequency f1)
 - p2183 (threshold frequency f2)
 - p2184 (threshold frequency f3)
 - p2185 (upper torque threshold 1)
 - p2186 (lower torque threshold 1)
 - p2187 (upper torque threshold 2)
 - p2188 (lower torque threshold 2)
 - p2189 (upper torque threshold 3)
 - p2190 (lower torque threshold 3)
 - p2192 (delay time for permitted deviation)
4. Apply lubrication if required.

A1690 Safety parameter changed**Cause**

The warning indicates that at least one parameter has been changed during the safety commissioning or safety parameter reset.

The warning will be removed automatically once the safety commissioning or safety parameter reset are completed.

Diagnosis & Remedy

Finish safety commissioning by setting p3900 = 10 or p3900 = 11 or wait until safety reset is complete.

A1691 SG signal inconsistency**Cause**

Problem with the consistency of safety rail G6. The drive will then reduce the speed according to the settings of the SBR.

When zero speed is reached, the SH is entered and a drive fault is generated.

Diagnosis & Remedy

Check consistency of safety rails and acknowledge the following safe standstill due to a drive fault.

A1692 Speed warning, SG exceeded**Cause**

1. Actual speed when entering the SG is higher than p9690 and p9692 is configured to trigger a SH with a drive fault.
2. Actual speed exceeds the SG tolerance p9691.
In both cases, the speed is reduced according to the settings for the SBR. SH will be entered once zero speed is reached and a fault is generated.

Diagnosis & Remedy

ad 1: Reduce speed before entering the SG or change the setting in p9692.

ad 2: increase the tolerance in p9691/p9891 compared to p9690/p9890.

Acknowledge the SH and the drive fault.

A1696 Switch-on is inhibited**Cause**

The switch-on of the drive not possible and the drive will therefore remain in the READY state (see r0002).

Diagnosis & Remedy

Check if a deactivated gate driver or the current safety mode (SH, SG, etc.) is inhibiting the start. Check the inhibit bit (r0052.6).

If the forced dynamisation is active (see r9601) the drive switch-on may be prevented for approximately 2.5 seconds after the SH state has been left.

A1697 Wrong safety data, running now with default values**Cause**

Semaphore problem at startup. Cannot load last safety parameters. Loading default values instead.

Diagnosis & Remedy

Restart drive (perform power cycle (24 V)) to load correct safety data.

Note

In order to detect errors when writing and saving safety-relevant data, the control system must read-out all of the safety-related parameters after switching on the control unit and before pulse release as well as in an 8-hour cycle and compare them with the expected values. In the case of a deviation, the system should go into a "safe standstill" state via the shutdown group and a message issued. This operation should be logged.

A1698 Safety commissioning/reset active**Cause**

The safety parameter reset or the safety commissioning are currently active (selected via p0010 = 95).

Diagnosis & Remedy

Finish commissioning with p3900 = 10 (accept changed) or p3900 = 11 (discard changes) or wait until the safety parameter reset is complete.

A1699 Verification of shut-down paths required**Cause**

Dynamisation timer (see r9660) has expired. A new dynamisation test is required.

Diagnosis & Remedy

- Select and then de-select SH when p9601 Bit01 and p9801 Bit01 are set.
- Power cycle (24 V)

Abbreviations

AC	Alternating current	DS	Drive state
AD	Analog digital converter	EEC	European Economic Community
ADC	Analog digital converter	EEPROM	Electrical erasable programmable read-only memory
ADR	Address	ELCB	Earth leakage circuit breaker
AFM	Additional frequency modification	EMC	Electro-magnetic compatibility
AG	Automation unit	EMF	Electromotive force
AIN	Analog input	EMI	Electro-magnetic interference
AOP	Advanced operator panel	ESB	Equivalent circuit
AOUT	Analog output	FAQ	Frequently asked questions
ASIC	Application-specific integrated circuit	FB	Function block
ASP	Analog setpoint	FCC	Flux current control
ASVM	Asymmetric space vector modulation	FCL	Fast current limit
BCC	Block check character	FF	Fixed frequency
BCD	Binary-coded decimal code	FFB	Free function block
BI	Binector input	FOC	Field orientated control
BICO	Binector / connector	FSA	Frame size A
BO	Binector output	GSG	Getting started guide
BOP	Basic operator panel	GUI ID	Global unique identifier
C	Commissioning	HIW	Main actual value
CB	Communication board	HSW	Main setpoint
CCW	Counter-clockwise	HTL	High-threshold logic
CDS	Command data set	I/O	Input and output
CI	Connector input	IBN	Commissioning
CM	Configuration management	IGBT	Insulated gate bipolar transistor
CMD	Commando	IND	Sub-index
CMM	Combimaster	JOG	Jog
CO	Connector output	KIB	Kinetic buffering
CO/BO	Connector output / Binector output	LCD	Liquid crystal display
COM	Common (terminal that is connected to NO or NC)	LED	Light emitting diode
COM-Link	Communication link	LGE	Length
CT	Commissining, ready to run	MHB	Motor holding brake
CT	Constant torque	MM4	MICROMASTER 4th. Generation
CUT	Commissining, run, ready to run	MOP	Motor potentiometer
CW	Clockwise	NC	Normally closed
DA	Digital analog converter	NO	Normally open
DAC	Digital analog converter	NPN	Negative positive negative
DC	Direct current	OPI	Operating instructions
DDS	Drive data set	PDS	Power drive system
DIN	Digital input	PID	PID controller (proportional, integral, derivative)
DIP	DIP switch	PKE	Parameter ID
DOUT	Digital output		

PKW	Parameter ID value	RFI	Radio-frequency interference
PLC	Programmable logic controller	RPM	Revolutions per minute
PLI	Parameter list	SCL	Scaling
PNP	Positive negative positive	SDP	Status display panel
POT	Potentiometer	SLVC	Sensorless vector control
PPO	Parameter process data object	STW	Control word
PTC	Positive temperature coefficient	STX	Start of text
PWE	Parameter value	SVM	Space vector modulation
PWM	Pulse-width modulation	TTL	Transistor-transistor logic
PX	Power extension	USS	Universal serial interface
PZD	Process data	VC	Vector control
QC	Quick commissioning	Vdc	DC-link voltage
RAM	Random-access memory	VT	Variable torque
RCCB	Residual current circuit breaker	ZSW	Status word
RCD	Residual current device	ZUSW	Additional setpoint
RFG	Ramp function generator		

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Parameter Manual for the frequency converter Frequency Converter ET 200S FC
Have you come across any errors when reading these Operating Instructions?
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We are grateful for any suggestions and recommendations for improvement..

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