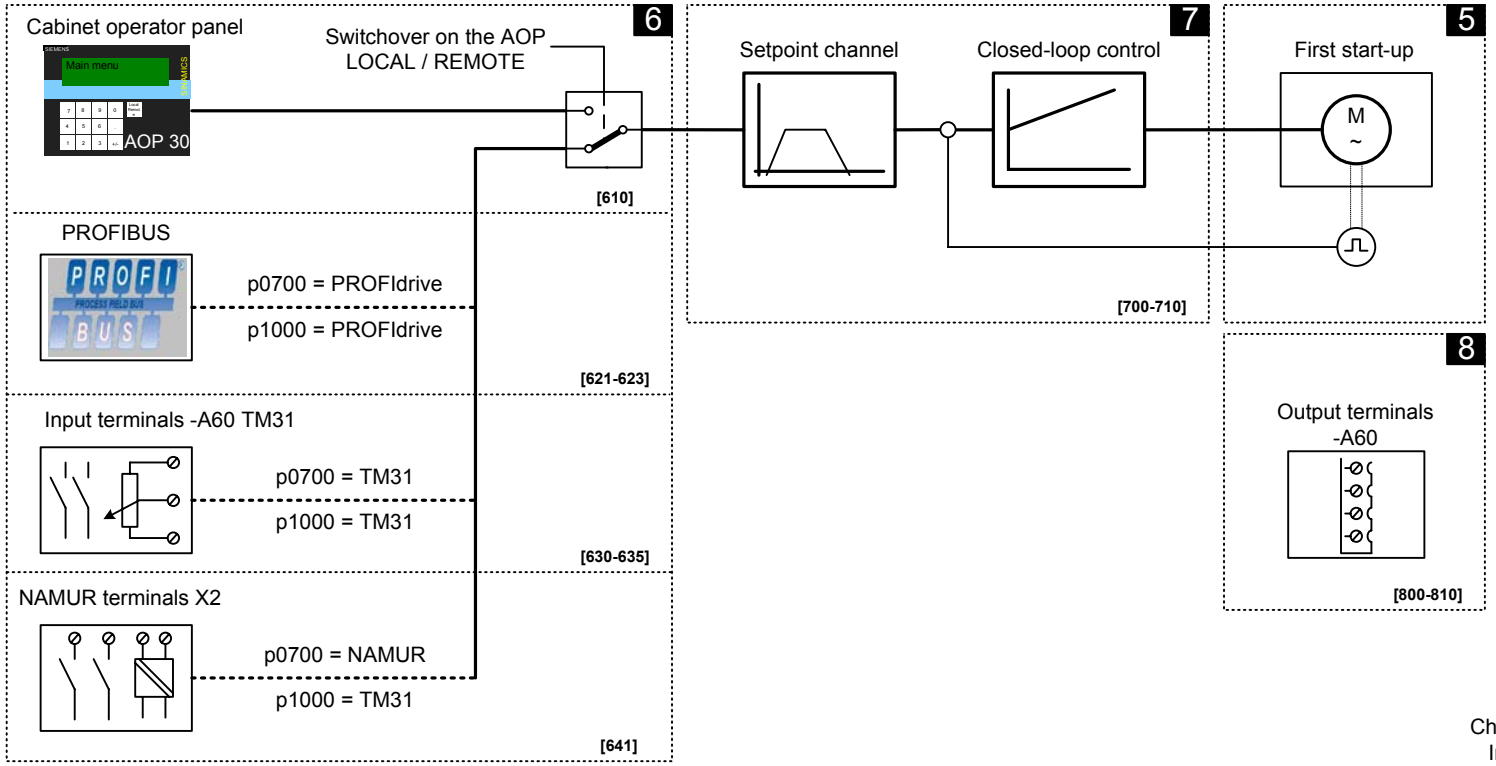
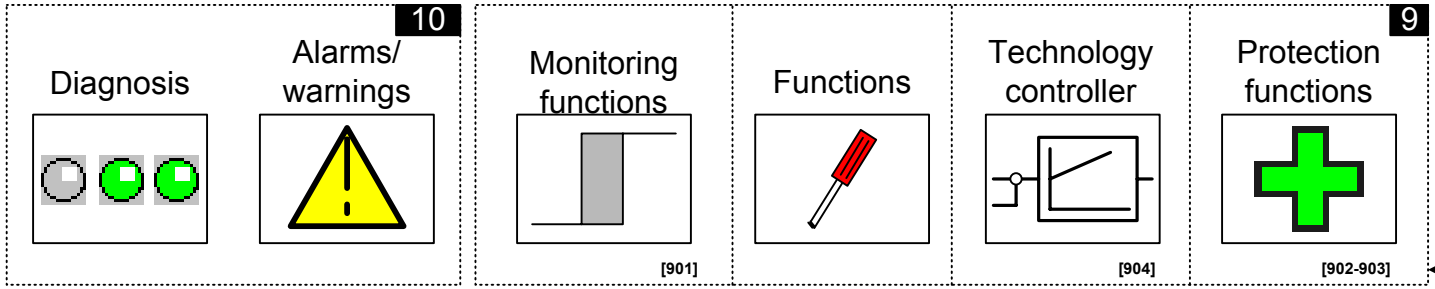
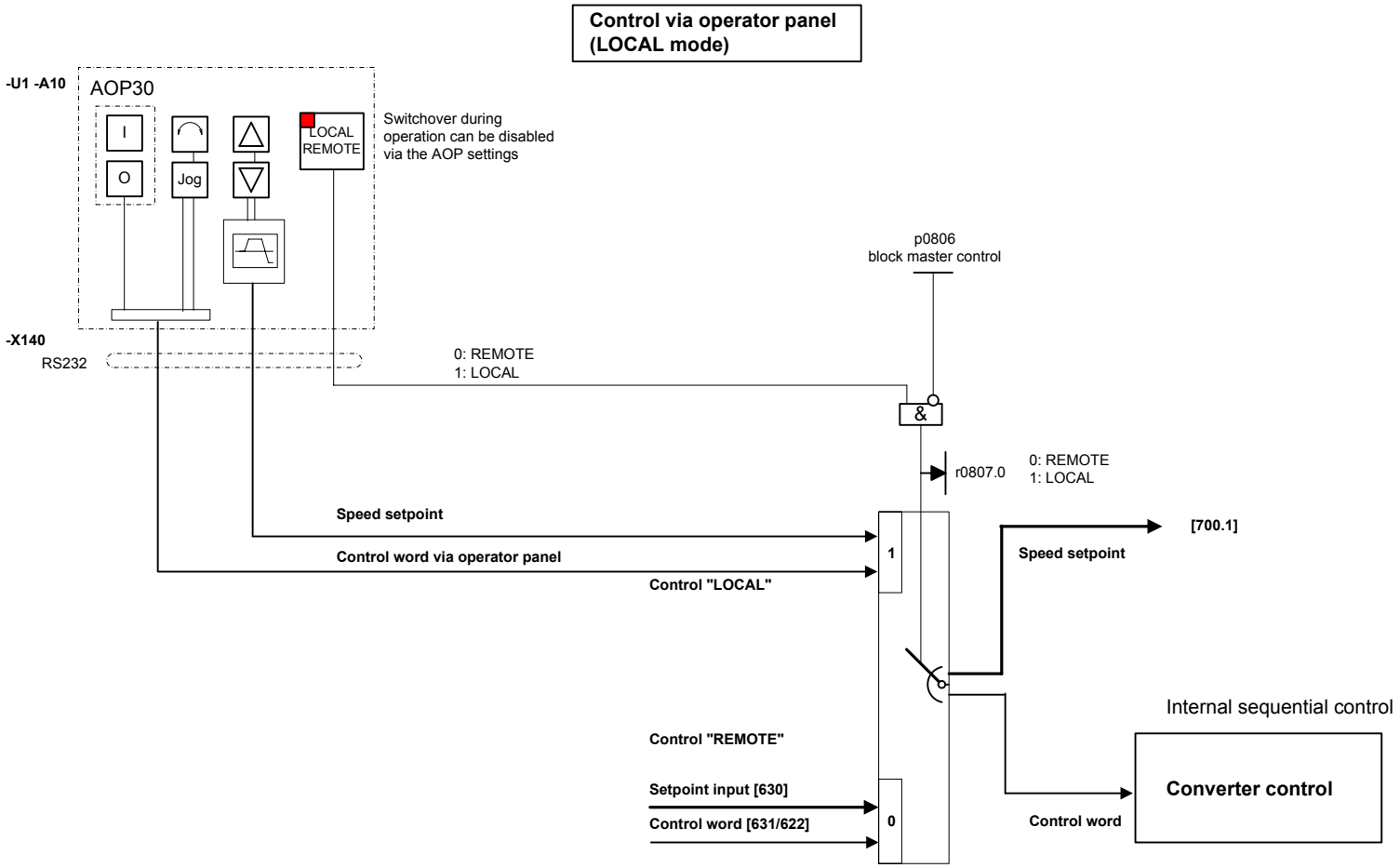
General view

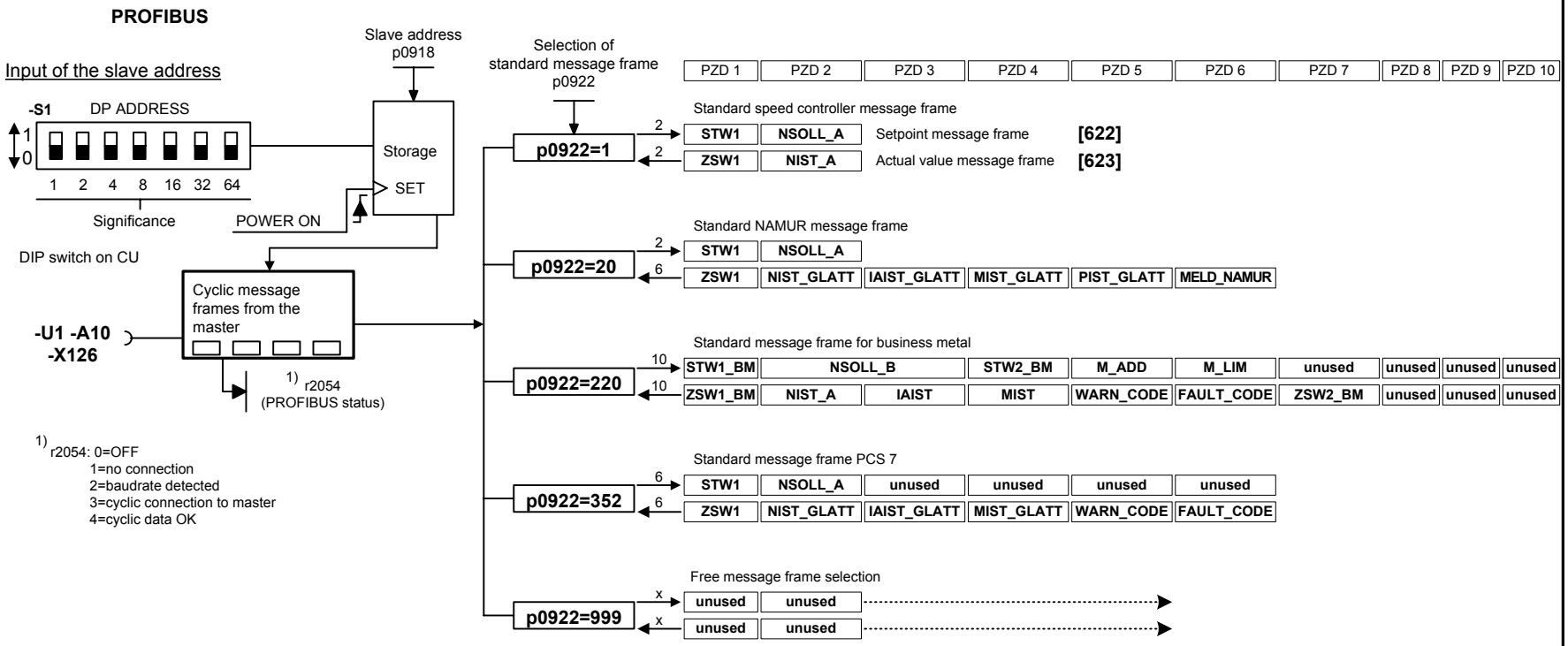




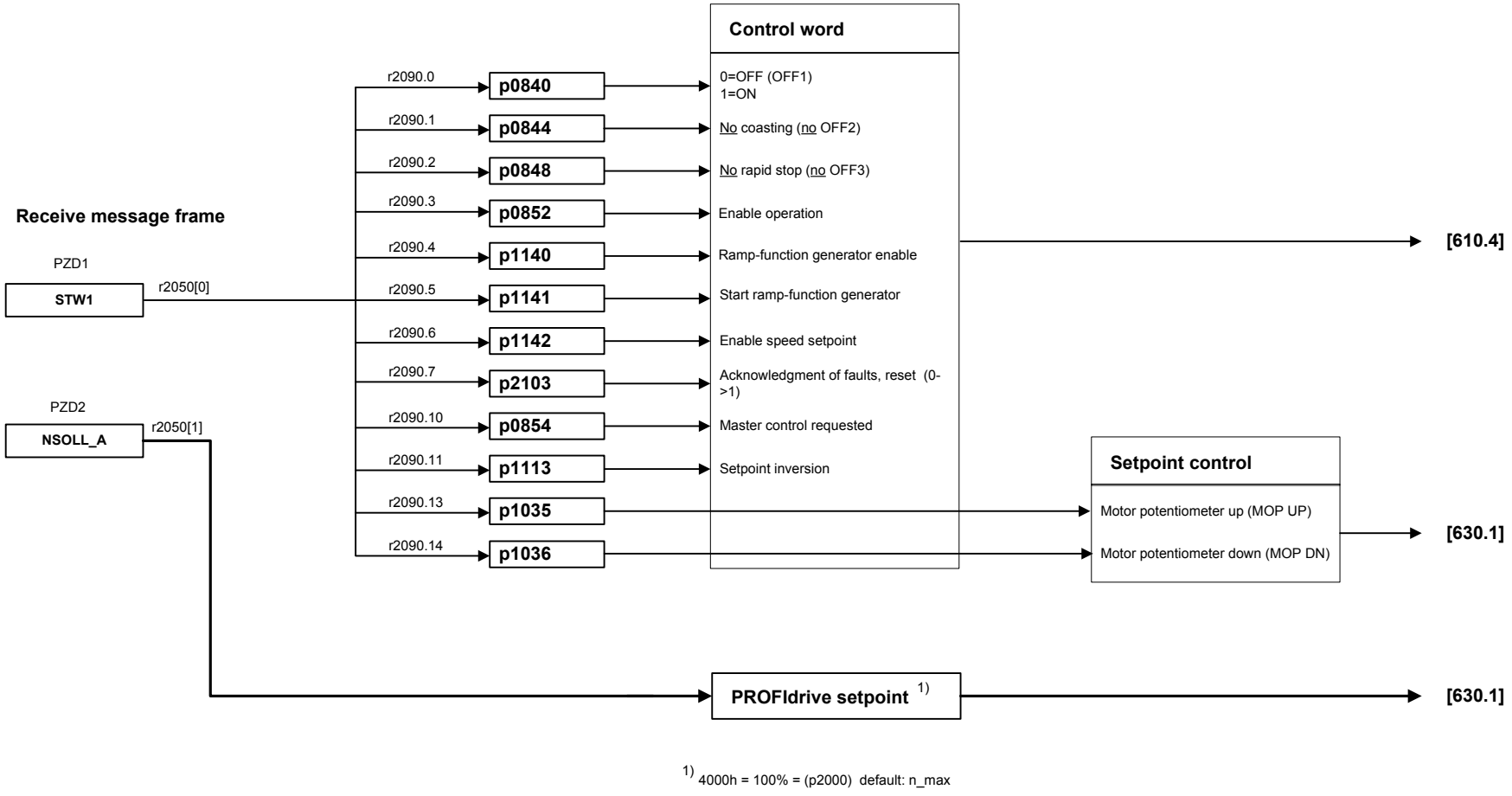
1	2	3	4	5	6	7	8
General view					A5E00197559A AG	Function diagram	- 010 -
					12.08.08	SINAMICS G150	


Control via operator panel
(LOCAL mode)
-U1 -A10
AOP30
I
O
Jog
LOCAL
REMOTE
Switchover during
operation can be disabled
via the AOP settings
-X140
RS232
0: REMOTE
1: LOCAL
p0806
block master control
&
r0807.0
0: REMOTE
1: LOCAL
Speed setpoint
Control word via operator panel
Control "LOCAL"
1
[700.1]
Speed setpoint
Internal sequential control
Control "REMOTE"
Setpoint input [630]
Control word [631/622]
0
Control word
Converter control

Communication via PROFIdrive



Control via PROFIdrive (REMOTE mode)



1) 4000h = 100% = (p2000) default: n_max

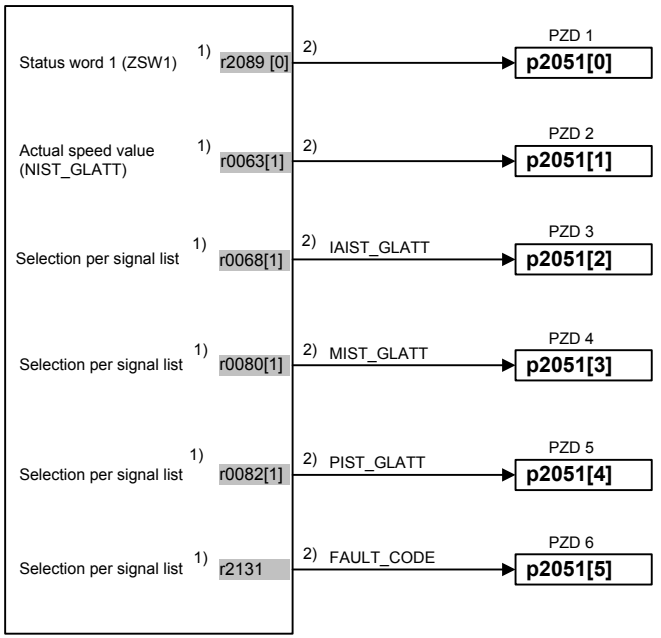
Status word 1 (ZSW 1)	
.0	Ready to start
.1	Ready to run
.2	Enable operation
.3	Fault
.4	OFF2 not active
.5	OFF3 not active
.6	Start block
.7	Warning
.8	No setpoint-actual value deviation
.9	PZD master control requested
.10	Reference value reached
.11	M/I/P limitation not active
.12	-
.13	Warning overtemp. motor (none)
.14	Clockwise
.15	Warning overtemp. converter (none)

r3113: NAMUR message bit bar	
.0	Software error
.1	Line supply fault
.2	DC link overvoltage
.3	Fault drive converter power electronics
.4	Drive converter overtemperature
.5	Ground fault
.6	Motor overload
.7	Bus error
.8	External safety-relevant shutdown
.9	Mot encoder fault
.10	Error internal communications
.11	Infeed fault
.12	reserved
.13	reserved
.14	reserved
.15	Other faults

Signal list	
Temperature motor	r0035
Power section overload I2T	r0036
Speed setpoint before filter	r0060
Motor speed	r0061
Speed setpoint after filter	r0062
Actual speed value after filtering	r0063
System deviation speed controller	r0064
Slip frequency	r0065
Frequencey of the Uoff	r0066
Maximum output current	r0067
Actual absolute current value unfiltered	r0068
Actual DC link voltage value	r0070
Converter output voltage	r0072
Actual field-producing current value	r0076
Actual torque-producing current value	r0078
Total torque setpoint	r0079
Actual torque value	r0080
Actual active power value	r0082
Setpoint before ramp generator	r1119
Speed setpoint speed controller	r1438
Present fault code	r2131
Present warning code	r2132
Input value of the analog inputs	r4055
Actual temperature value (TM31)	r4105
Status word 1 (ZSW1)	r2089 [0]
Status of digital inputs of the TM31	r4022
Status of digital outputs of the TM31	r4047

Selection of the transmit message frames

Transmit telegram



Normalizations: 100 %, 4000h(W), 4000 0000(DW), 1.0 (F) =...
n: p2000 U: p2001 I: p2002 M: p2003 P: p2004 Temperature: 100°C

NACT_A: Actual speed value (100%=4000h=p2000)

I_ACT: Actual current value (100%=4000h=p2000)

FAULT: For fault number (r0947), see fault list

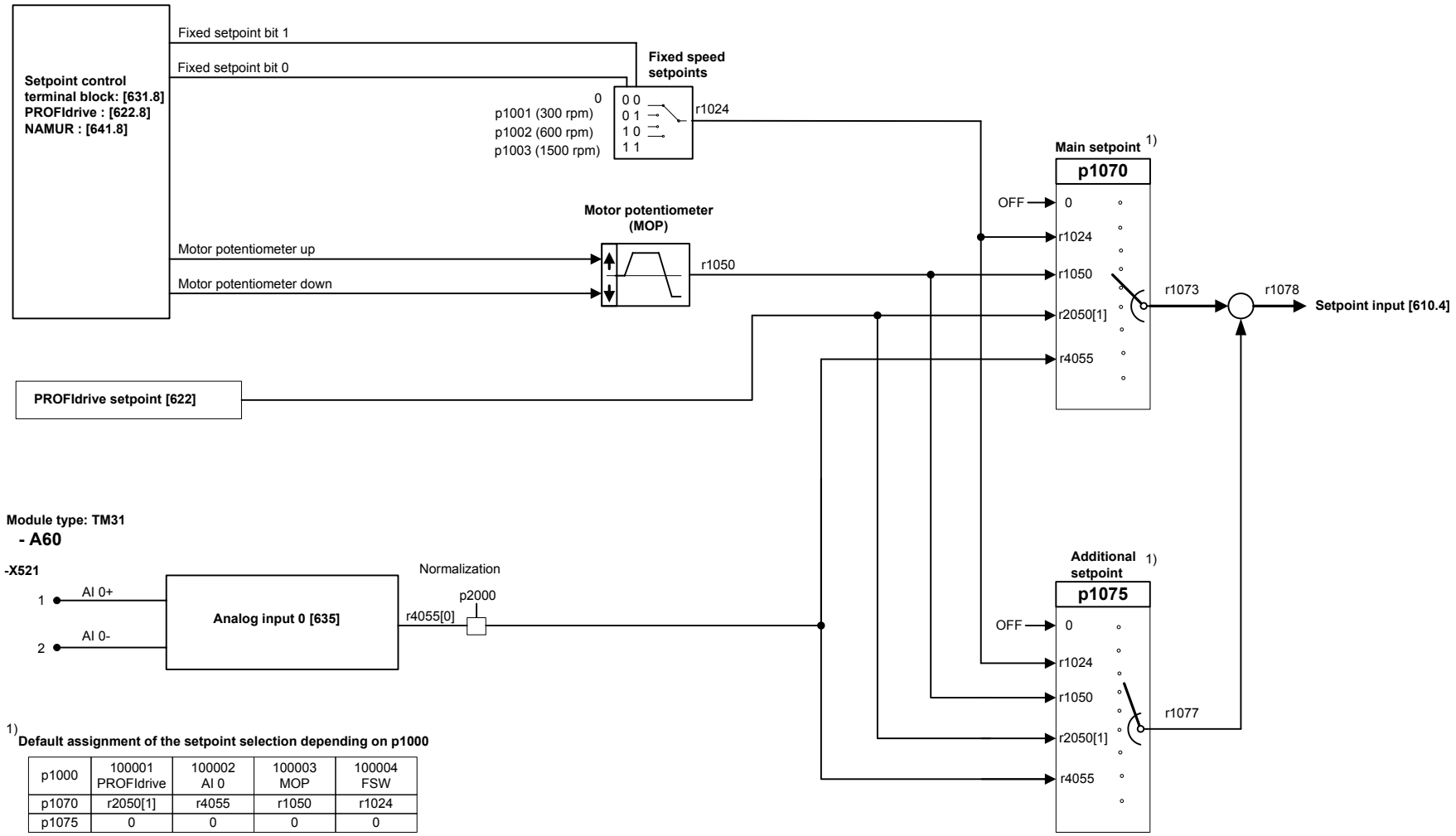
M_ACT: (100%=4000h=p2003) actual torque value

P_ACT: (100%=4000h=p2004) actual active power value

1)
Default assignment of the transmit message frames depending on p0922

p0922	PZD 1 p2051[0]	PZD 2 p2051[1]	PZD 3 p2051[2]	PZD 4 p2051[3]	PZD 5 p2051[4]	PZD 6 p2051[5]	PZD 7 p2051[6]	PZD 8 p2051[7]	PZD 9 p2051[8]	PZD 10 p2051[9]
1	r2089[0]	r0063[0]	---	---	---	---	---	---	---	---
20	r2089[0]	r0063[1]	r0068[1]	r0080[1]	r0082[1]	r3113	---	---	---	---
220	r2089[0]	r0063[0]	r0068[0]	r0080[0]	r2132	r2131	r2089[1]	unused	unused	unused
352	r2089[0]	r0063[1]	r0068[1]	r0080[1]	r2132	r2131	---	---	---	---
999	unused	unused	unused	unused	unused	unused	---	---	---	---

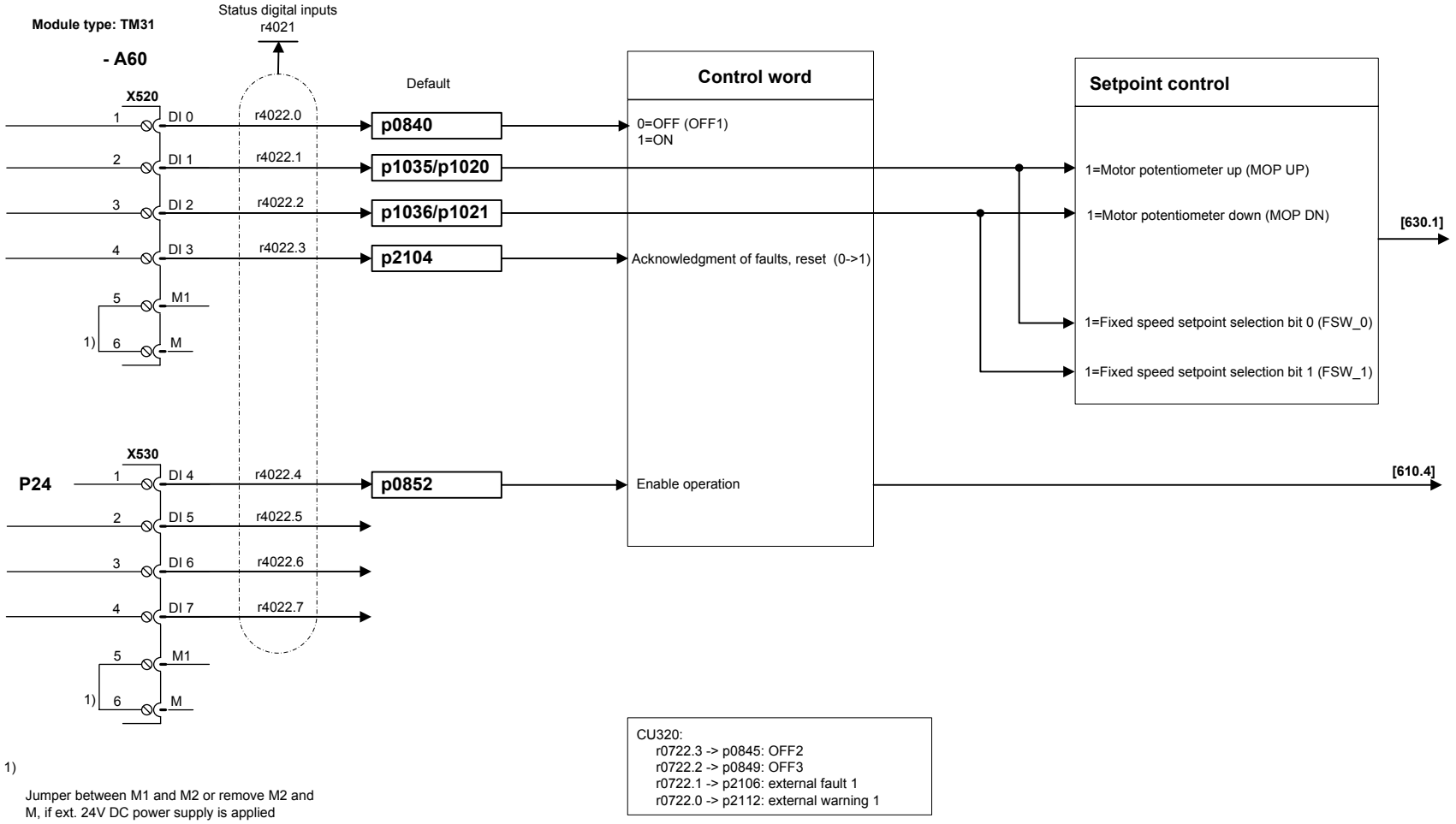
2)
Factory setting: transmit message frame p0922 = 999 with default assignment as in diagram



1) **Default assignment of the setpoint selection depending on p1000**

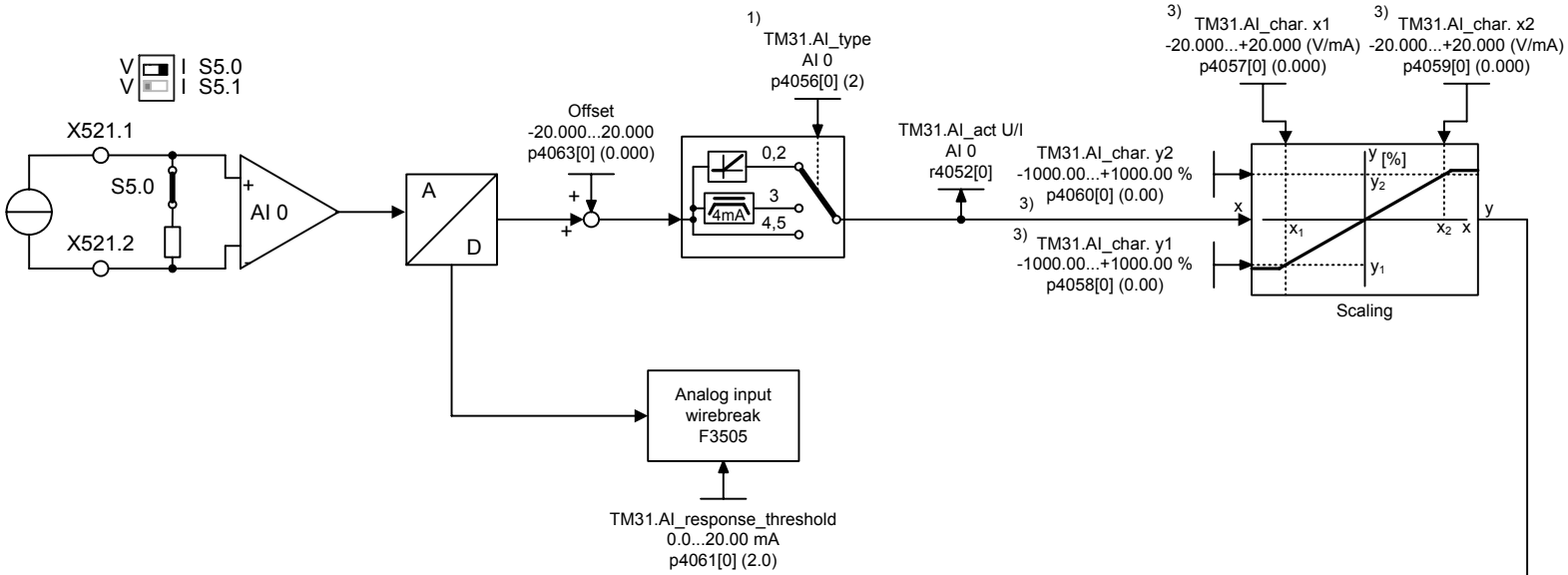
p1000	100001 PROFIdrive	100002 AI 0	100003 MOP	100004 FSW
p1070	r2050[1]	r4055	r1050	r1024
p1075	0	0	0	0

Control via terminal block (REMOTE mode)



1)

Jumper between M1 and M2 or remove M2 and M, if ext. 24V DC power supply is applied



1)
0: Voltage input (0 to +10 V)
2: Current input (0 to +20 mA)
3: Current input (4 to +20 mA) monitored
4: Voltage input (-10 V ... +10 V)
5: Current input (-20 mA ... +20 mA)

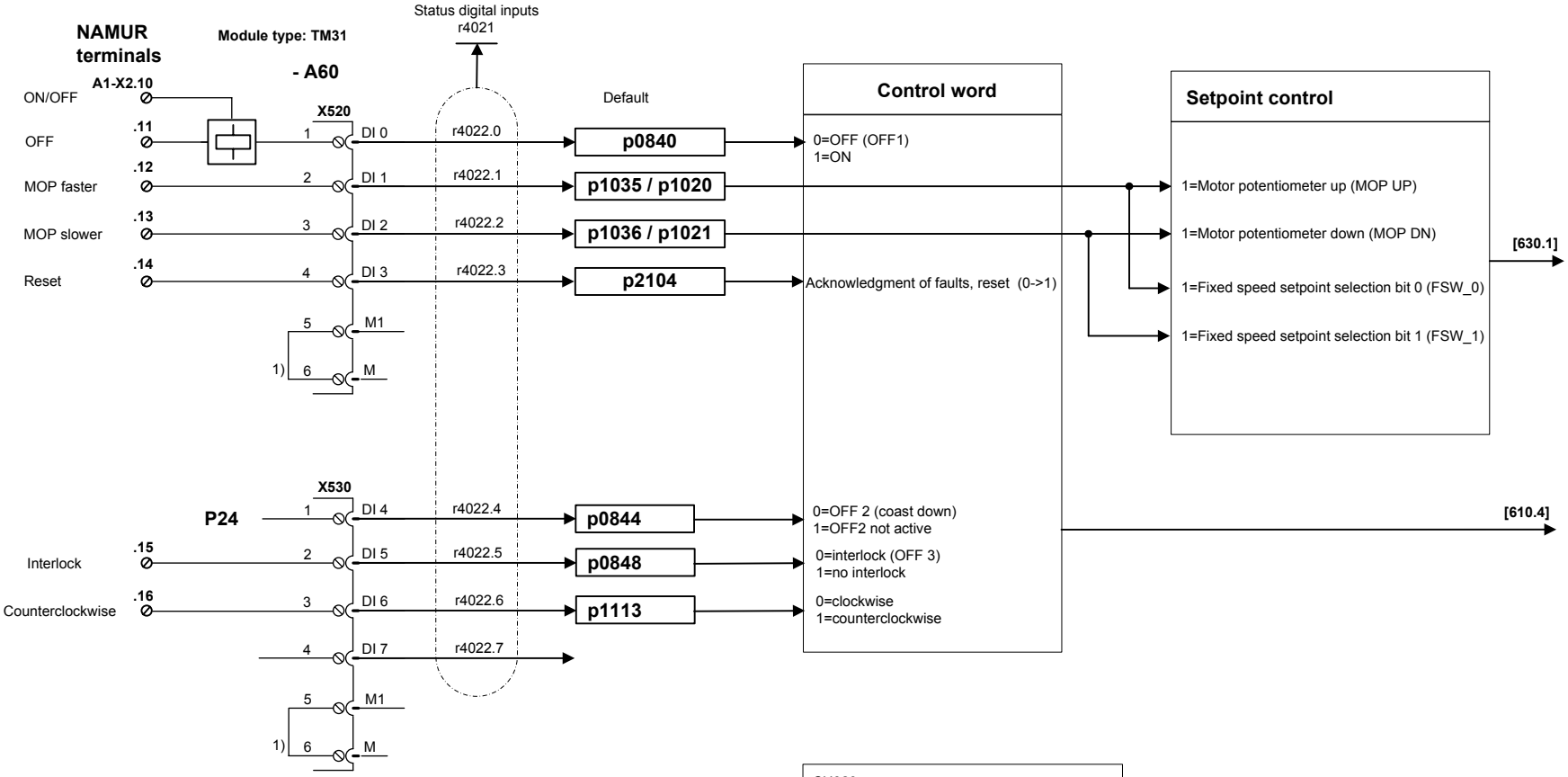
3)
Default assignment of the scaling depending on p4056

p4056	p4057	p4058	p4059	p4060
0...10 V	0 V	0 %	10 V	100 %
0...20 mA	0 mA	0 %	20 mA	100 %
4...20 mA	4 mA	0 %	20 mA	100 %
-10...10 V	0 V	0 %	10 V	100 %
-20...20 mA	0 mA	0 %	20 mA	100 %

2) Reference speed: 100 % = (p2000) default: n_max

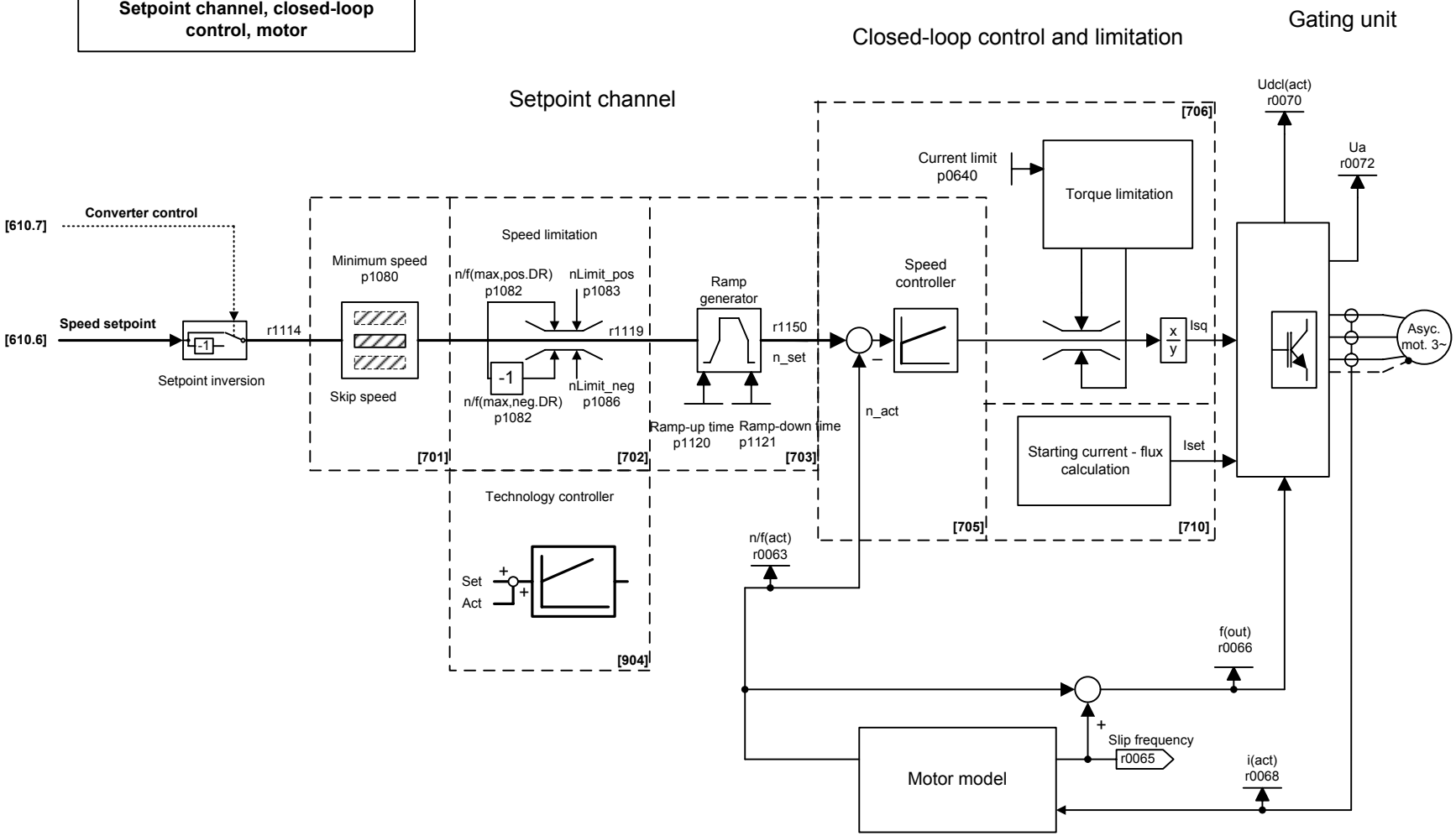
1	2	3	4	5	6	7	8
Speed setpoint input					A5E00197559A AG	Function diagram	- 635 -
Setpoint input via AI 0 (scaling of the analog inputs) - Chapter 6 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	

Control via the NAMUR terminal block (REMOTE mode)



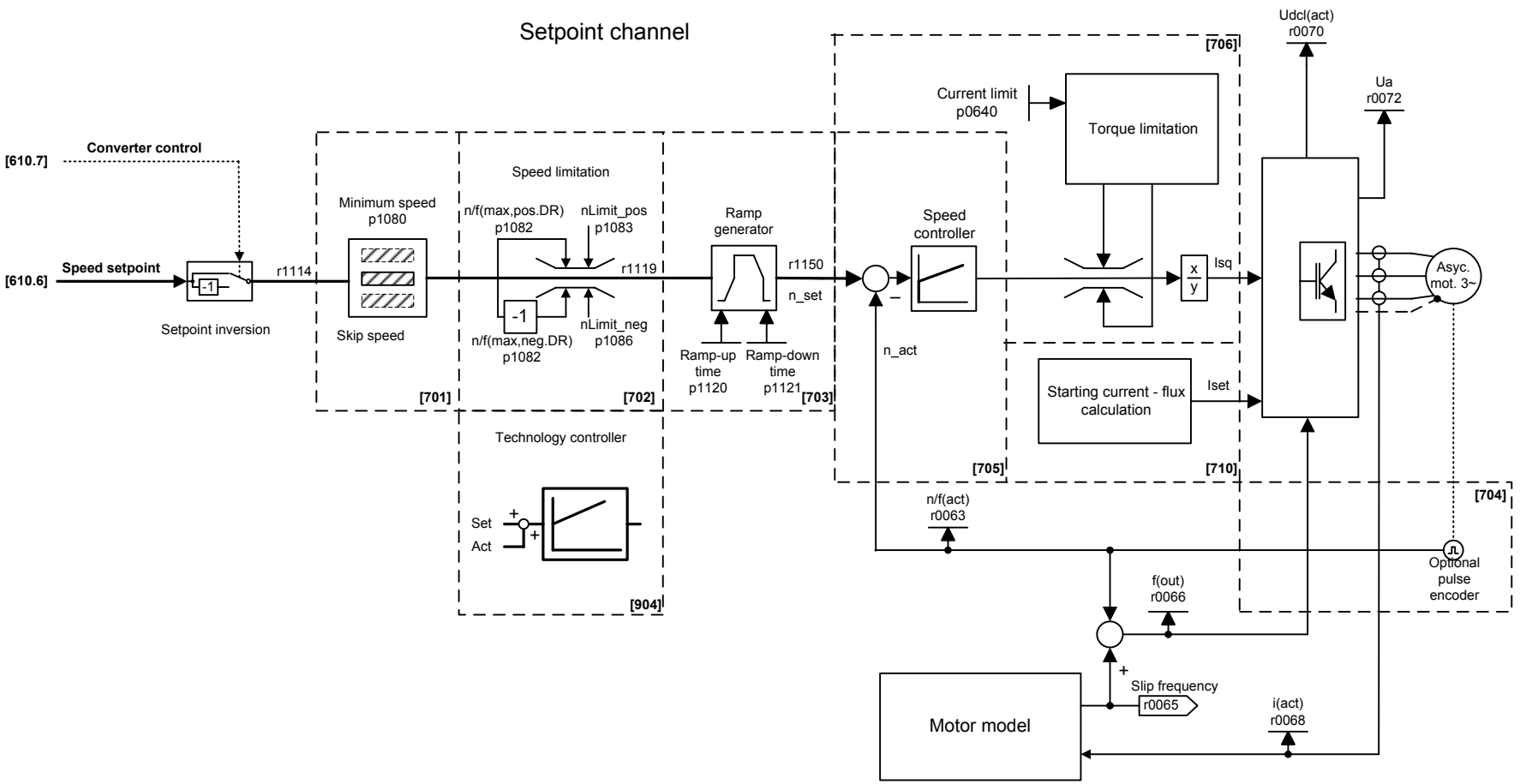
1	2	3	4	5	6	7	8
Control via NAMUR terminal block					A5E00197559A AG	Function diagram	- 641 -
p0700 = 70007 - Chapter 6 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	

Setpoint channel, closed-loop control, motor

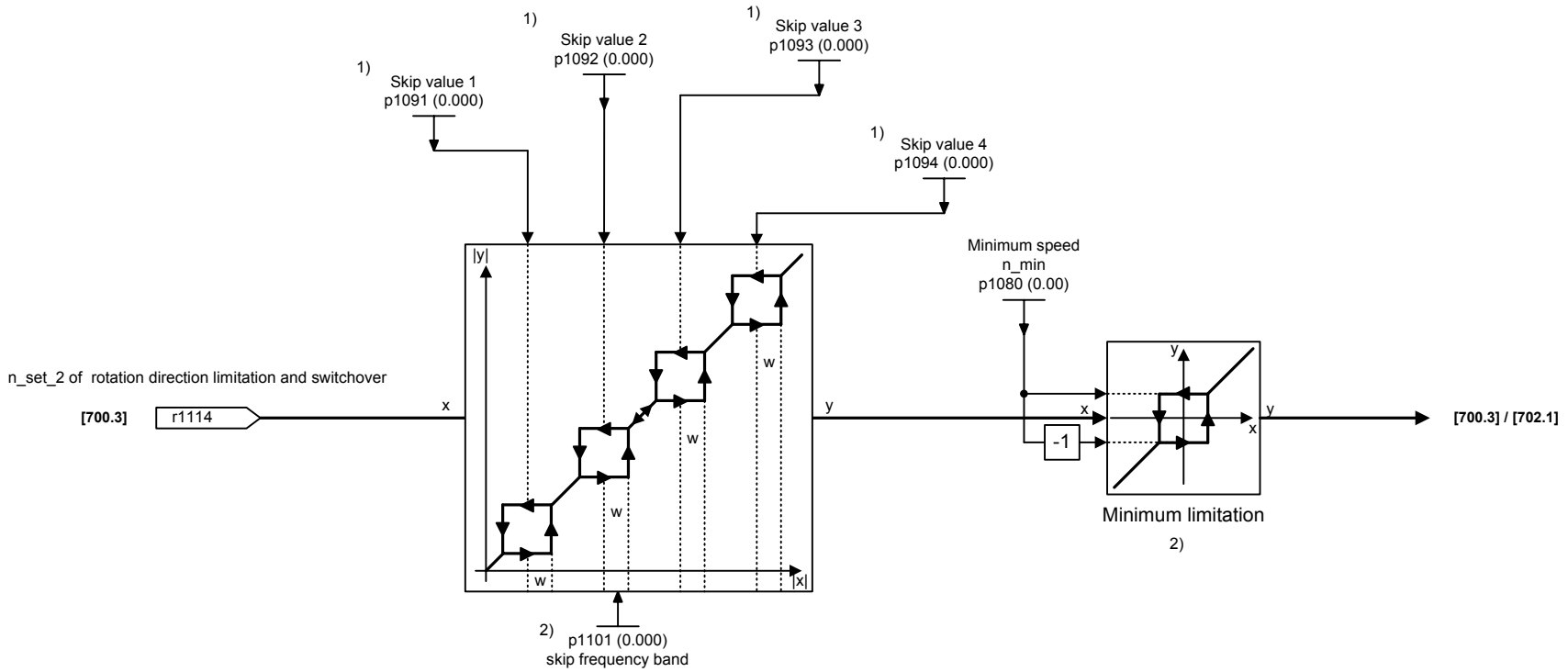


1	2	3	4	5	6	7	8
Setpoint channel, closed-loop control, limitation, motor					A5E00197559A AG	Function diagram	- 700a -
General view without encoder - Chapter 7 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	

Setpoint channel, closed-loop control, motor

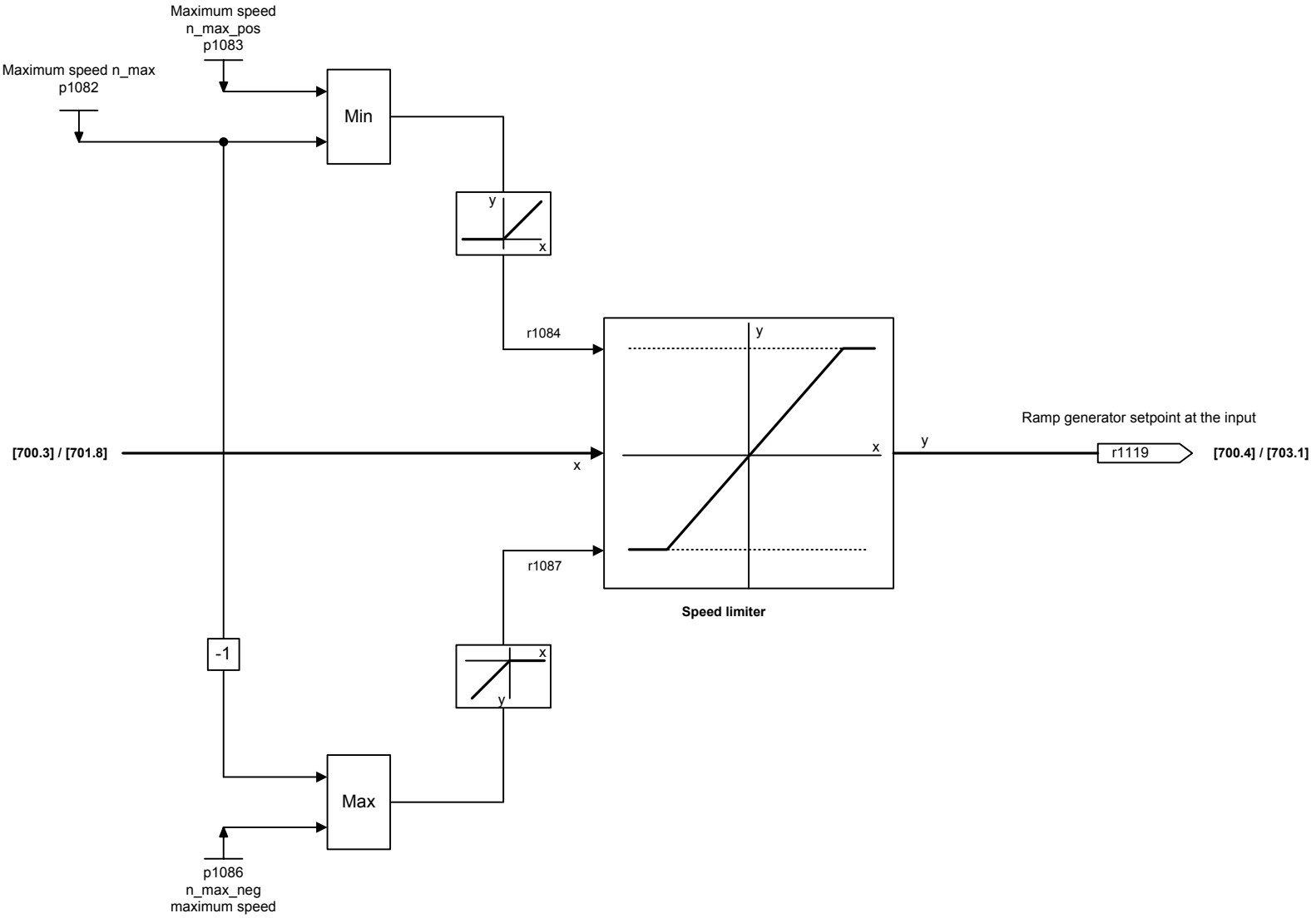


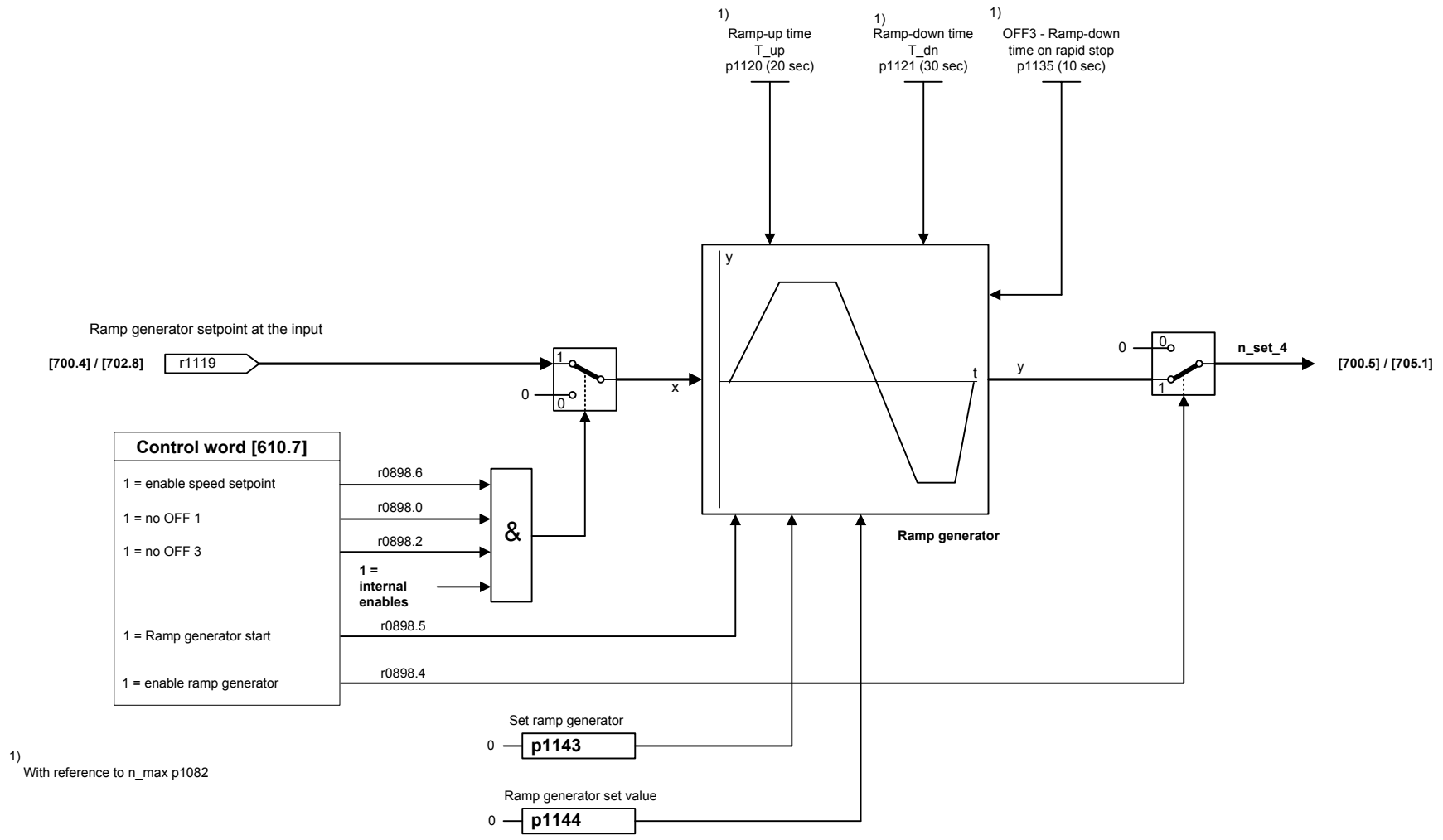
1	2	3	4	5	6	7	8
Setpoint channel, closed-loop control, limitation, motor					A5E00197559A AG	Function diagram	- 700b -
General view with encoder - Chapter 7 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	



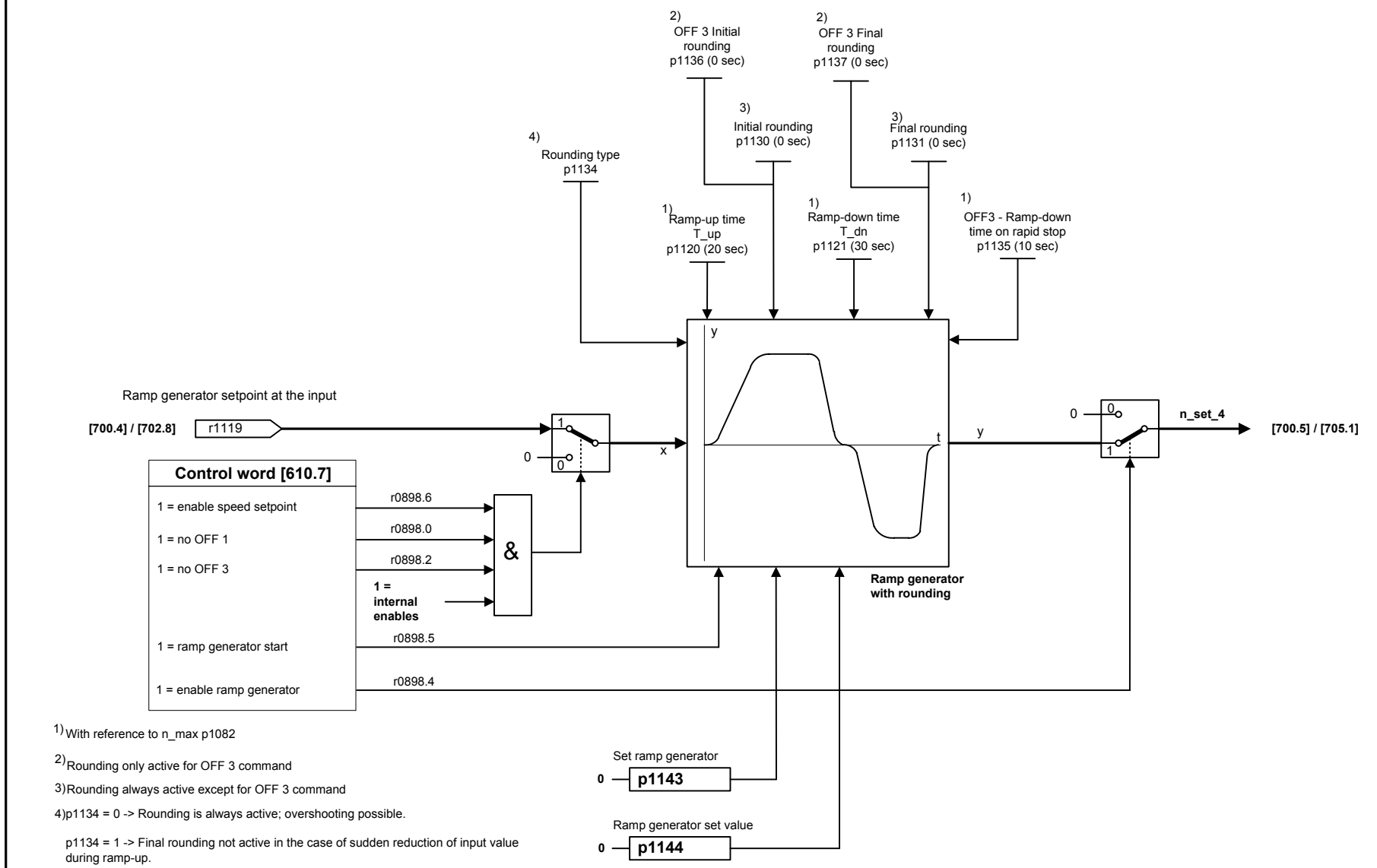
1) A skip value of "0" deactivates the skip frequency band.

2) If the drive is shut down not by the input setpoint but by open-loop control intervention, the following ramp-up follows the lower part of the hysteresis loop.


Maximum speed
n_max_pos
p1083
Maximum speed n_max
p1082
Min
y
x
r1084
y
x
y
Ramp generator setpoint at the input
[700.3] / [701.8]
x
r1119
[700.4] / [703.1]
r1087
Speed limiter
-1
x
y
Max
p1086
n_max_neg
maximum speed



1	2	3	4	5	6	7	8
Setpoint channel					A5E00197559A AG	Function diagram	- 703a -
Single ramp-function generator (p1115 = 0) - Chapter 7 of the Instruction Manual (OI)					12.08.08	SINAMICS G150	



1) With reference to n_max p1082

2) Rounding only active for OFF 3 command

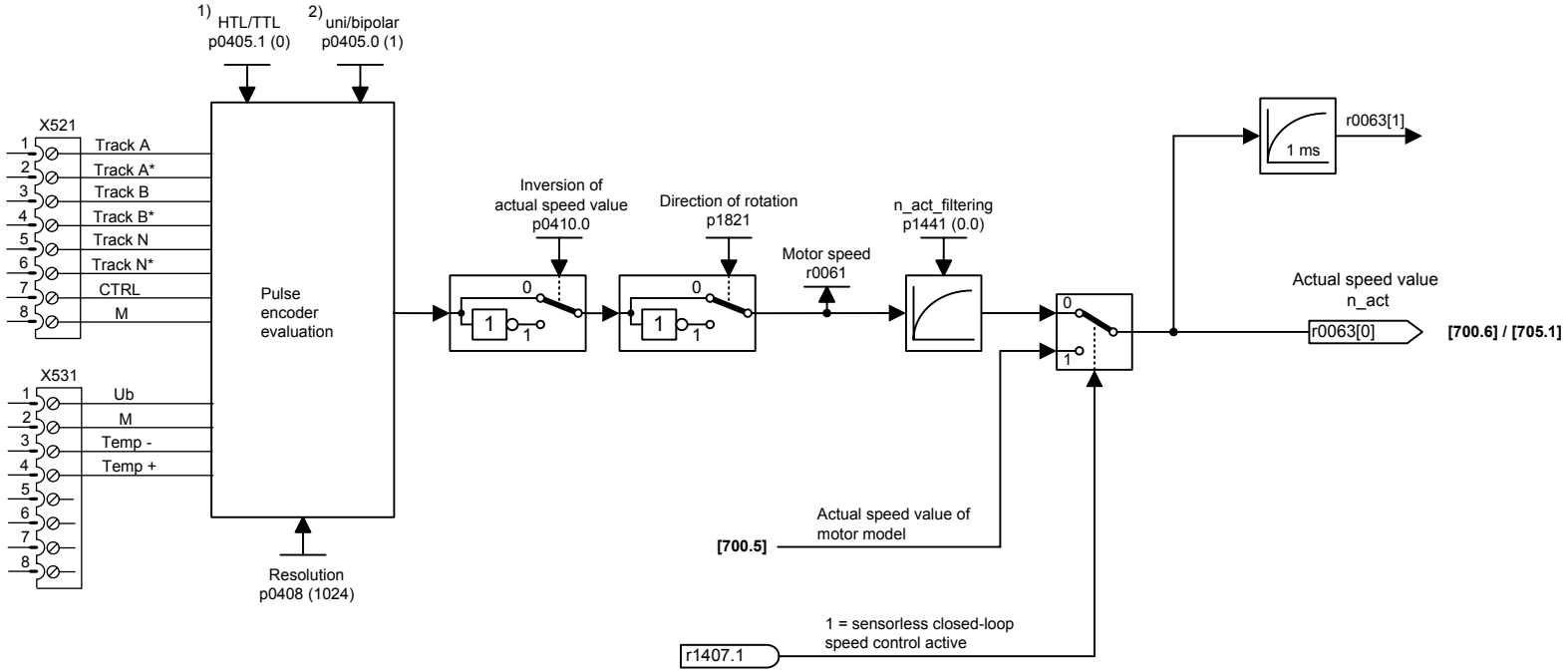
3) Rounding always active except for OFF 3 command

4) p1134 = 0 -> Rounding is always active; overshooting possible.

p1134 = 1 -> Final rounding not active in the case of sudden reduction of input value during ramp-up.

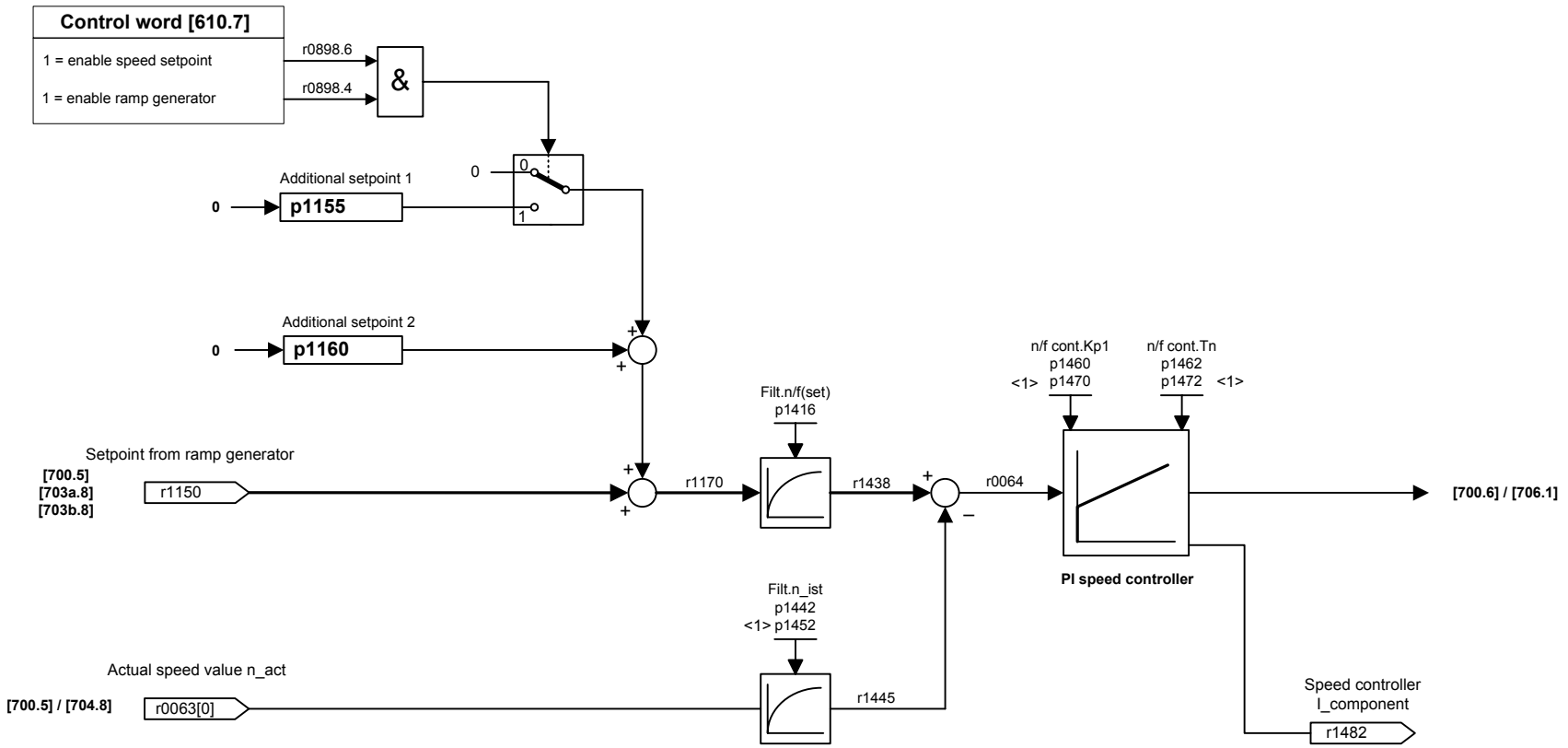
1	2	3	4	5	6	7	8
Setpoint channel					A5E00197559A AG	Function diagram	- 703b -
Extended ramp-function generator (p1115 = 1) - Chapter 7 of the Instruction Manual (Oi)					12.08.08	SINAMICS G150	

Pulse encoder connection to SMC 30

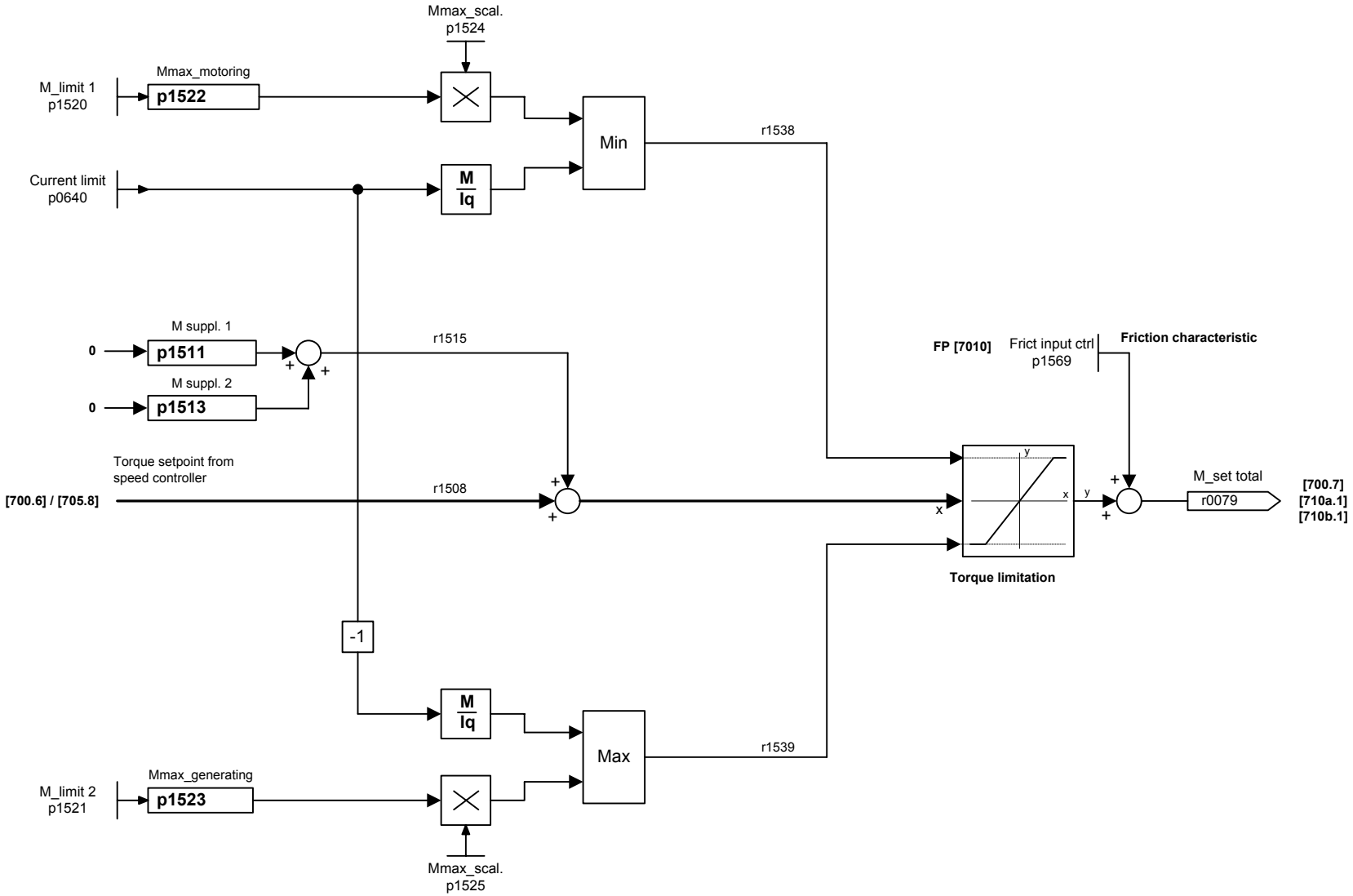


1) p0405.1 = 0 -> HTL -> Ub = 24 V
p0405.1 = 1 -> TTL -> Ub = 5 V

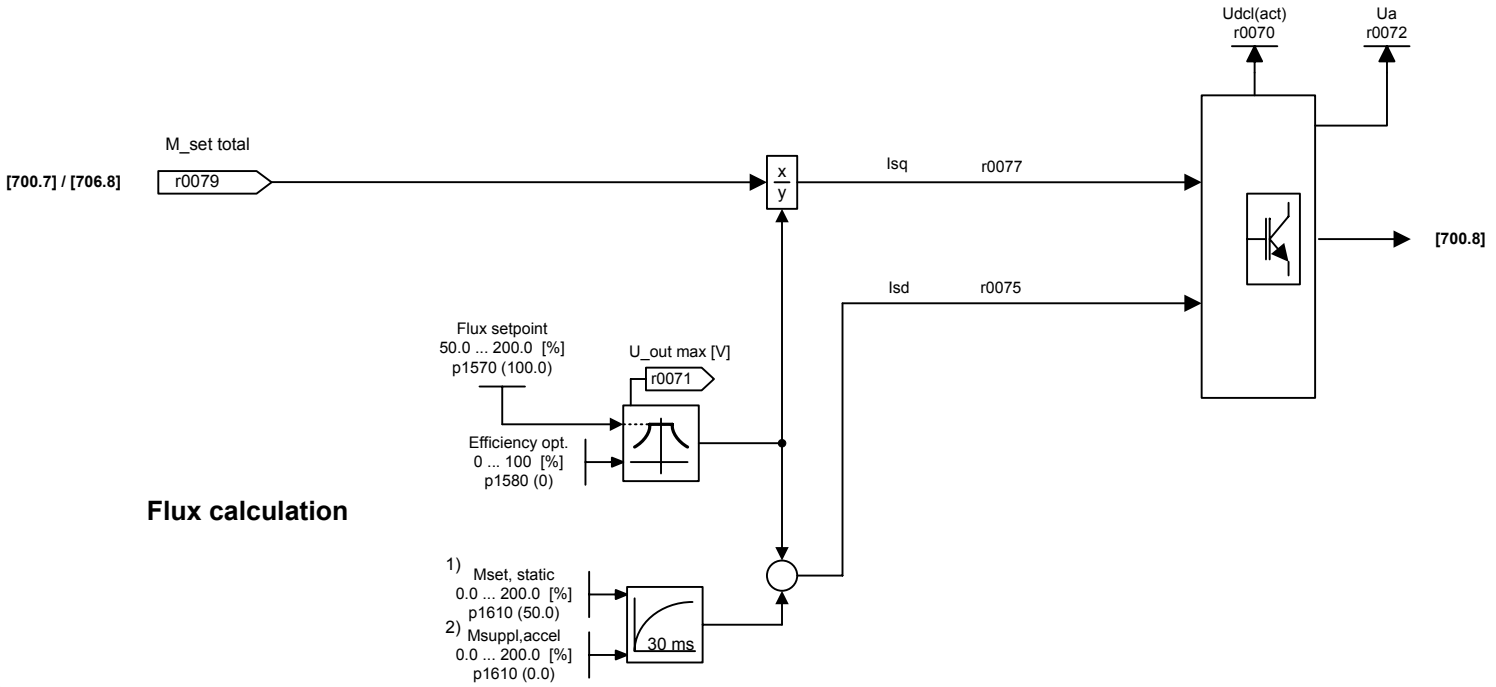
2) p0405.0 = 0 -> bipolar -> connection A/A*, B/B*
p0405.0 = 1 -> unipolar -> connection A/M , B/M
In the case of a unipolar connection, inputs A*, B*, and N* must be connected to ground GND.



<1> Only for sensorless vector control



1	2	3	4	5	6	7	8
Closed-loop control					A5E00197559A AG	Function diagram	- 706 -
Torque and current limitation - Chapter 7 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	

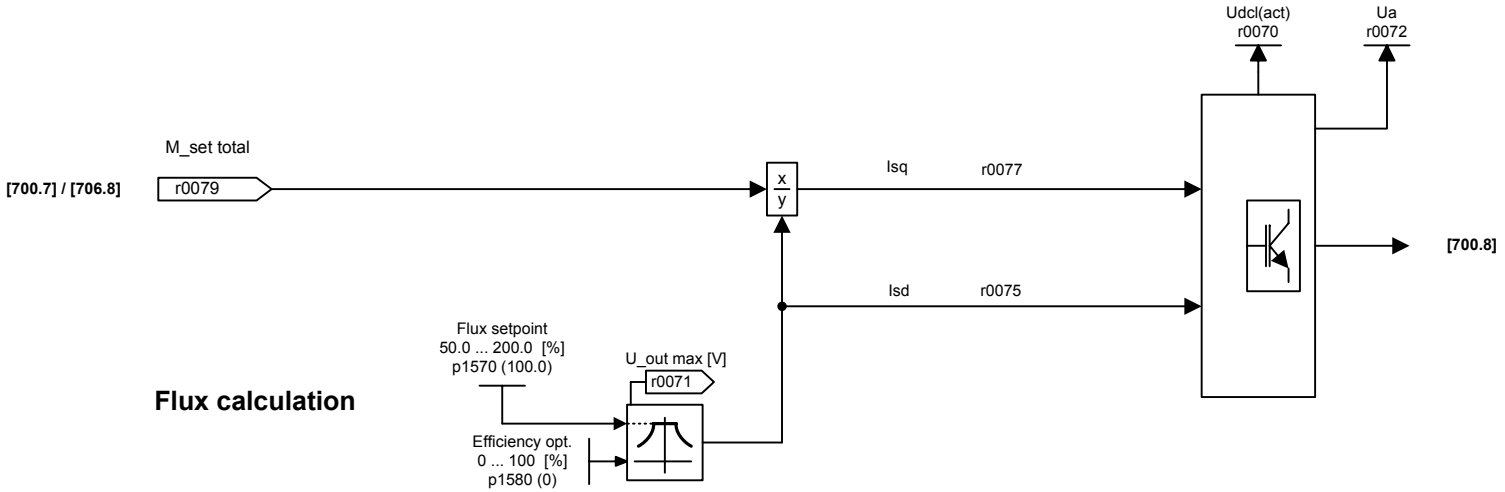


Flux calculation

1) Static starting torque in controlled range

2) Dynamic starting torque in controlled range

1	2	3	4	5	6	7	8
Closed-loop control					A5E00197559A AG	Function diagram	- 710a -
Flux calculation without encoder - Chapter 7 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	

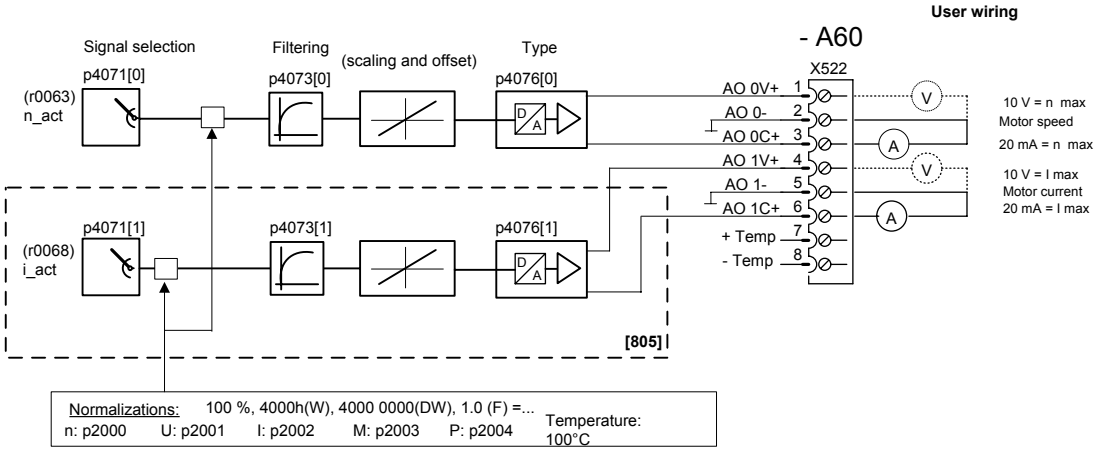


Flux calculation

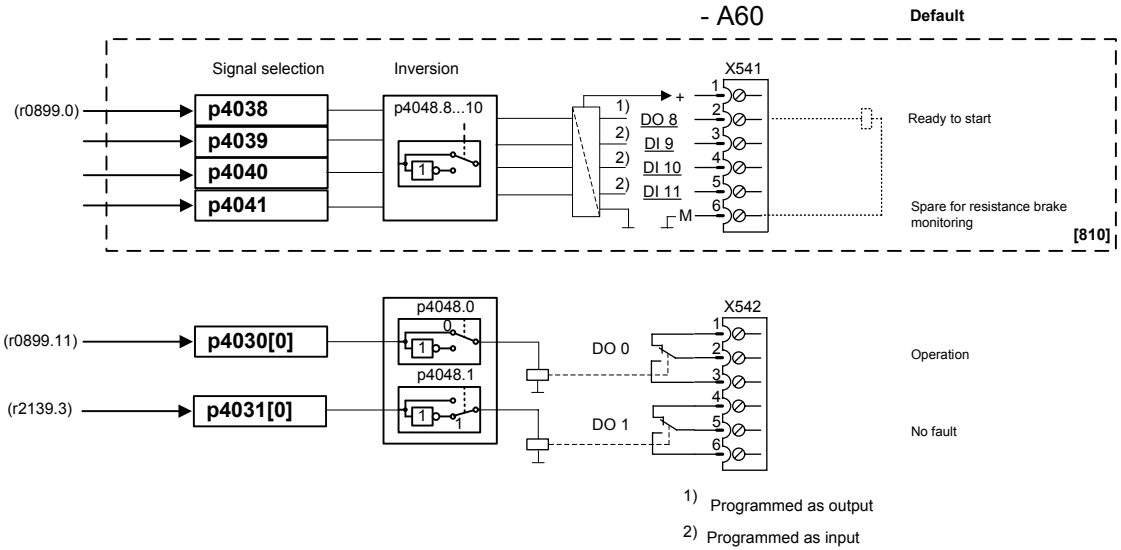
1	2	3	4	5	6	7	8
Closed-loop control					A5E00197559A AG	Function diagram	**- 710b -**
Flux calculation with encoder - Chapter 7 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	

Output terminal block (-A60)

Basic signals: Analog	
Speed setpoint	r0060
Actual speed value	r0063
Output frequency	r0066
Output current	r0068
DC link voltage	r0070
Torque setpoint	r0079
Output power	r0082
Actual torque value	r0080

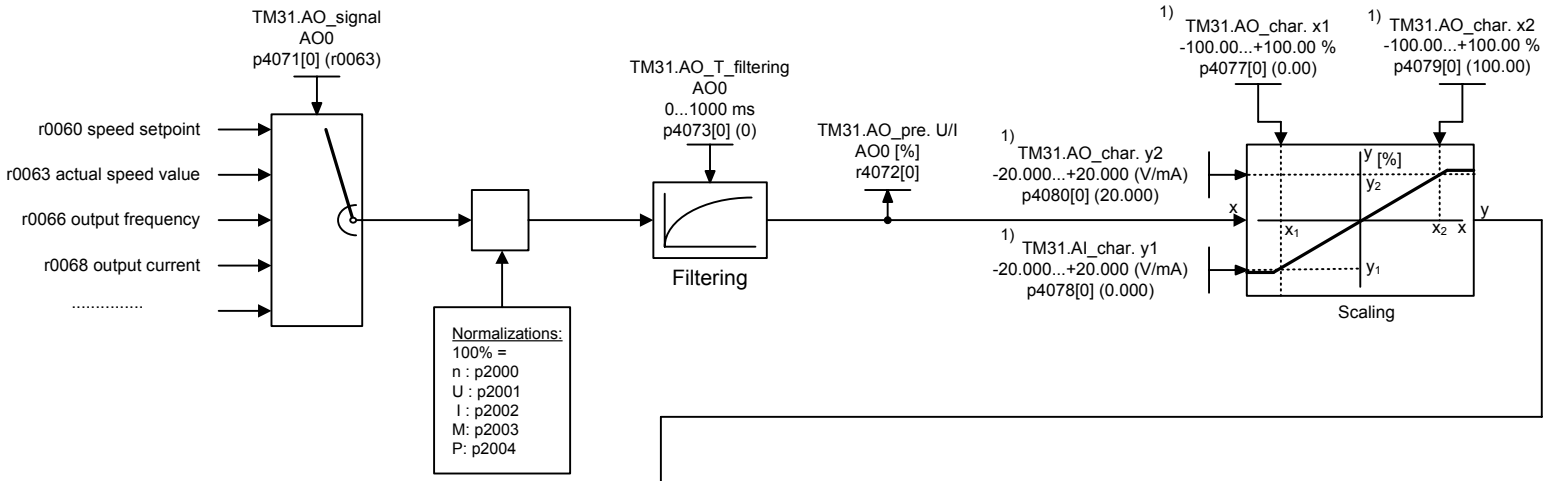


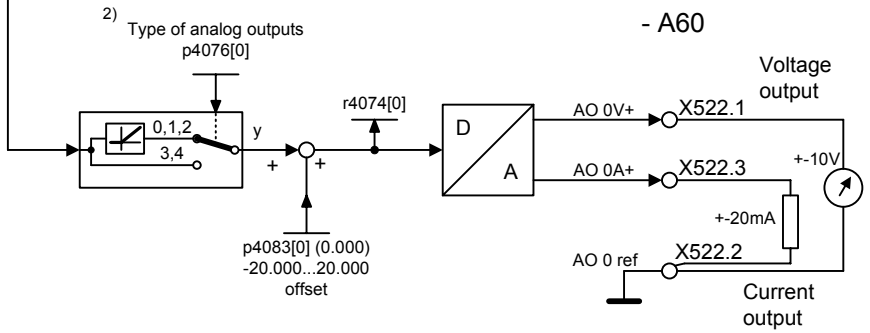
Signal selection: Digital	
1=ready to start	r0899.0
1=ready to run	r0899.1
1=enable operation	r0899.2
1=fault active	r2139.3
0=coasting active (OFF2)	r0899.4
0=rapid stop active (OFF3)	r0899.5
1=switch-on disable	r0899.6
1=warning active	r2139.7
1=speed setpoint-actual value deviation in tolerance band	r2197.7
1=master control requested to PLC	r0899.9
1=f or n reference value reached or exceeded	r2199.1
1=I, M or P limit reached	r1407.7
0=warning overtemperature motor	r2129.14
0=warning therm. overload power t.	r2129.15
1=enable pulses	r0899.11
1=n_act<=p2155	r2197.1
1=n_act>p2155	r2197.2
1=ramp-up/ramp-down ended	r2199.5
1=n_act<p2161	r2199.0
1=torque setpoint<p2174	r2198.10
1=LOCAL MODE active	r0807.0



1	2	3	4	5	6	7	8
Output terminal block (-A60)					A5E00197559A AG	Function diagram	- 800 -
General view - Chapter 8 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	

Example of AO 0 of the TM31



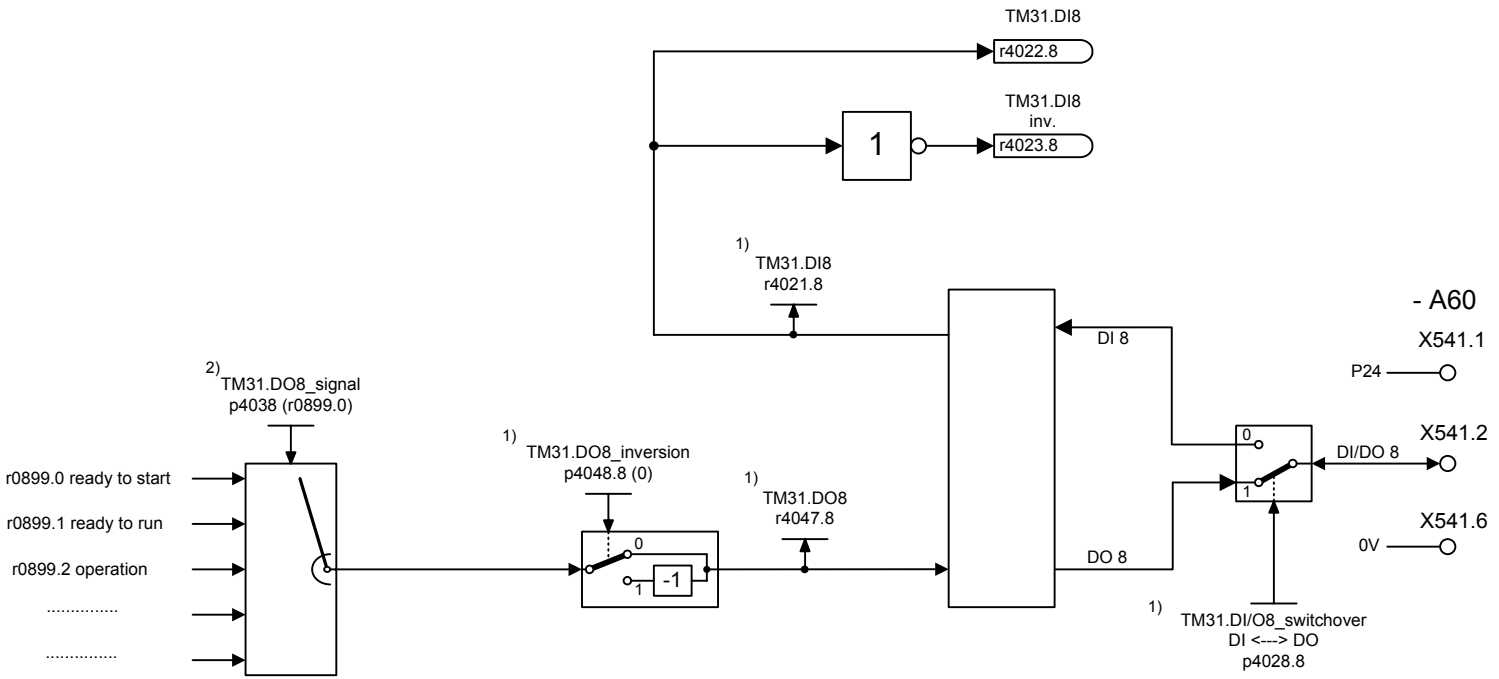


1)
Default assignment of the scaling depending on p4076

p4076	p4077	p4078	p4079	p4080
0...20 mA	0 %	0 mA	100 %	20 mA
0...10 V	0 %	0 V	100 %	10 V
4...20 mA	0 %	4 mA	100 %	20 mA
-20...20 mA	0 %	0 mA	100 %	20 mA
-10...10 V	0 %	0 V	100 %	10 V

2)
0: Current output (0... +20 mA)
1: Voltage output (0 to +10 V)
2: Current output (4... +20 mA) monitored
3: Current output (-20 mA... +20 mA)
4: Voltage output (-10 V... +10 V)

Example of DI/DO 8 of the TM31

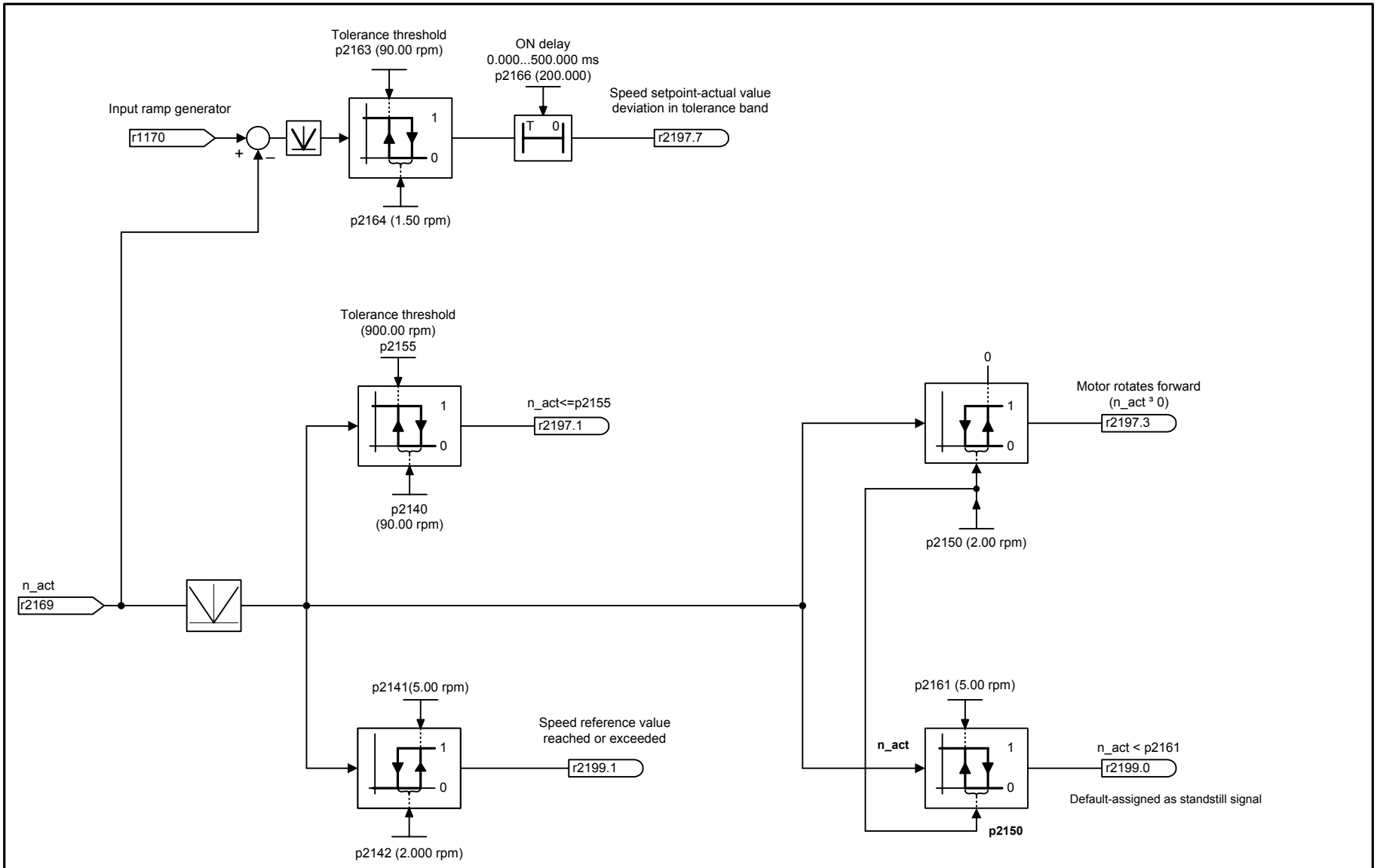


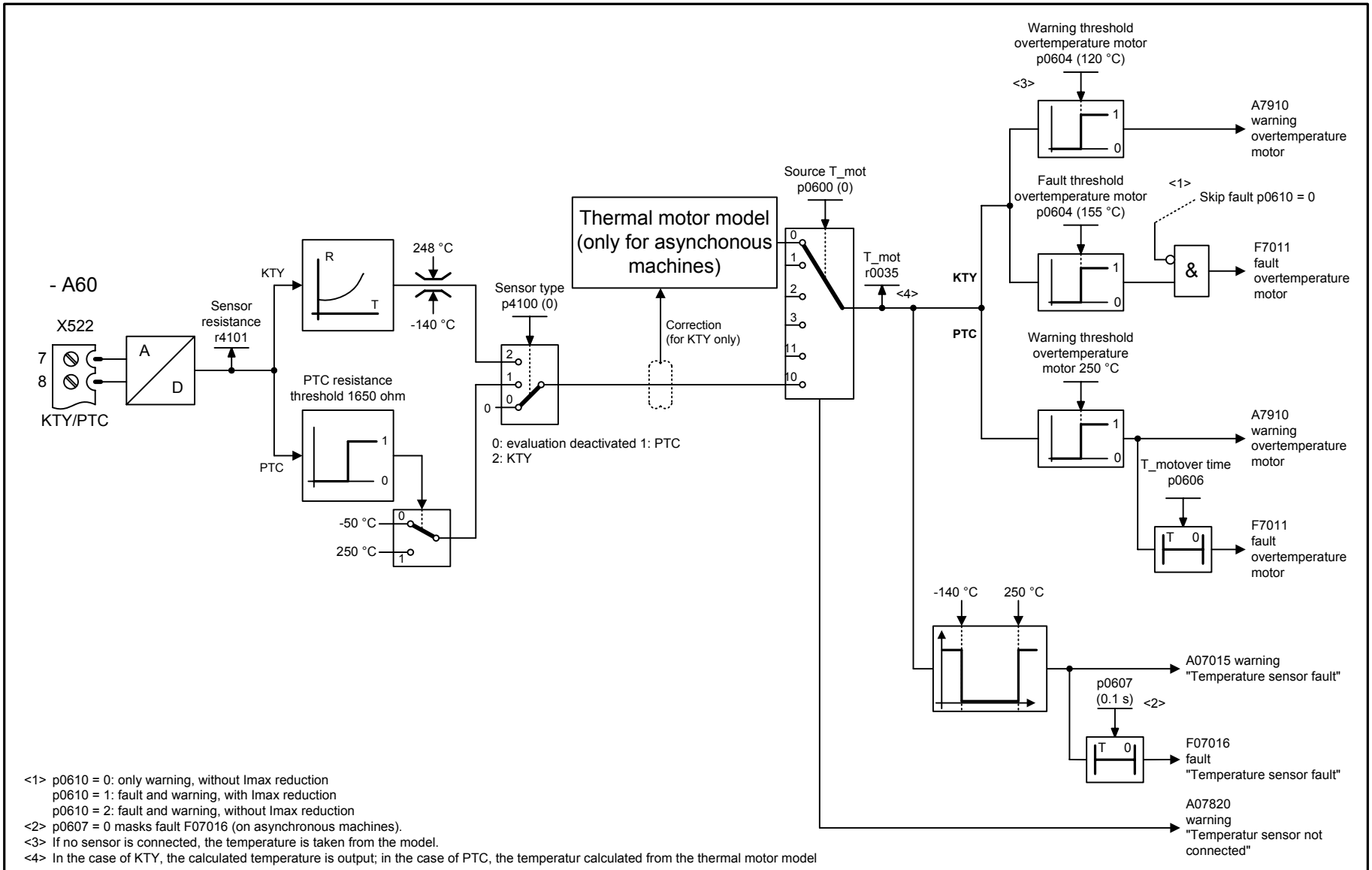
1) Index assignment depending on inputs/outputs 8 to 11

DI/DO	p4021.	p4022.	p4023.	p4028.	p4047.	p4048.
8	8	8	8	8	8	8
9	9	9	9	9	9	9
10	10	10	10	10	10	10
11	11	11	11	11	11	11

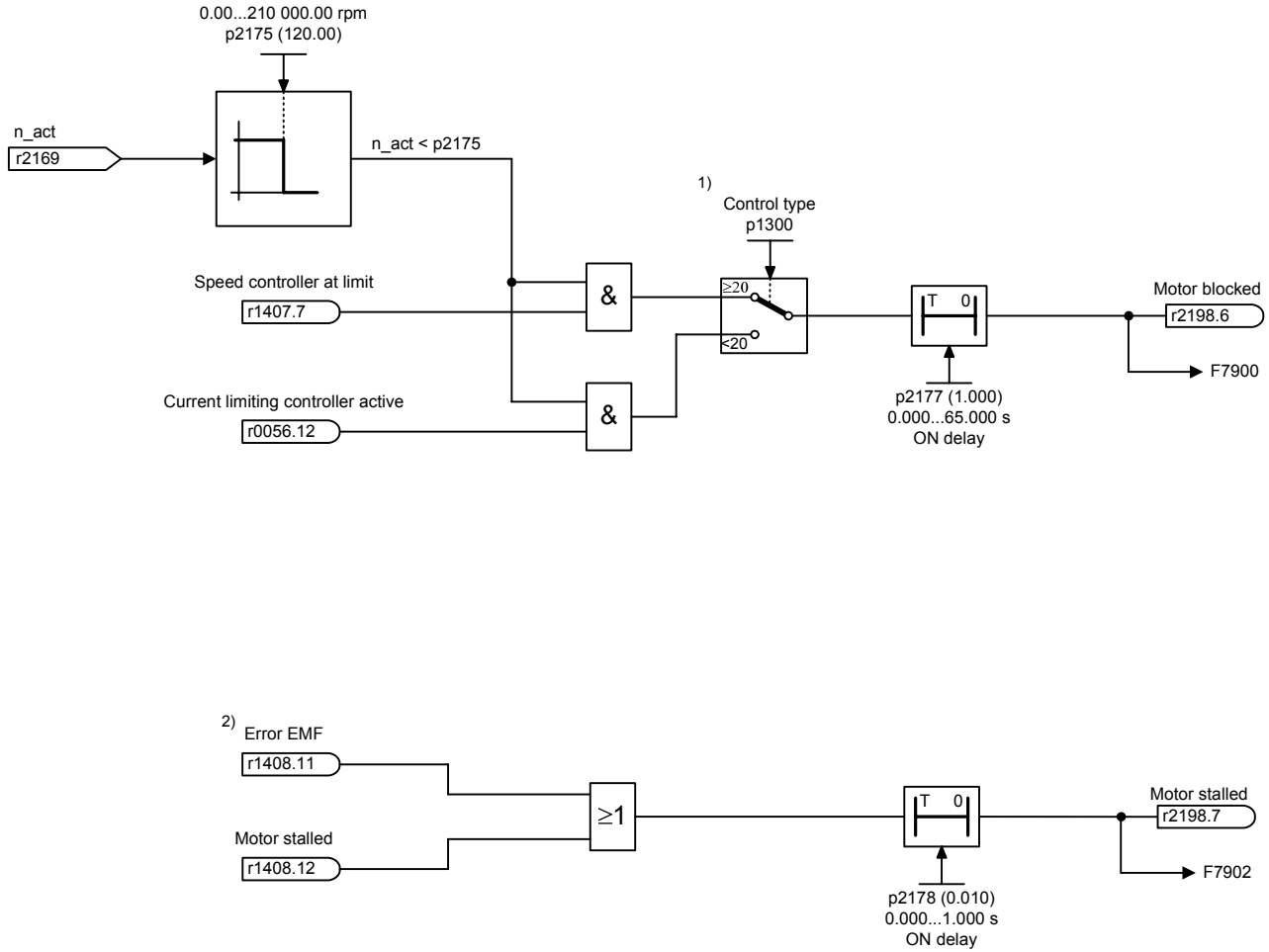
2) Parameter for selecting the digital outputs

DI/DO	Selection output
8	p4038
9	p4039
10	p4040
11	p4041


Tolerance threshold
p2163 (90.00 rpm)
ON delay
0.000...500.000 ms
p2166 (200.000)
Input ramp generator
r1170
Speed setpoint-actual value
deviation in tolerance band
r2197.7
p2164 (1.50 rpm)
Tolerance threshold
(900.00 rpm)
p2155
n_act<=p2155
r2197.1
p2140
(90.00 rpm)
0
Motor rotates forward
(n_act ³ 0)
r2197.3
p2150 (2.00 rpm)
n_act
r2169
p2141(5.00 rpm)
Speed reference value
reached or exceeded
r2199.1
p2142 (2.000 rpm)
p2161 (5.00 rpm)
n_act
n_act < p2161
r2199.0
Default-assigned as standstill signal
p2150



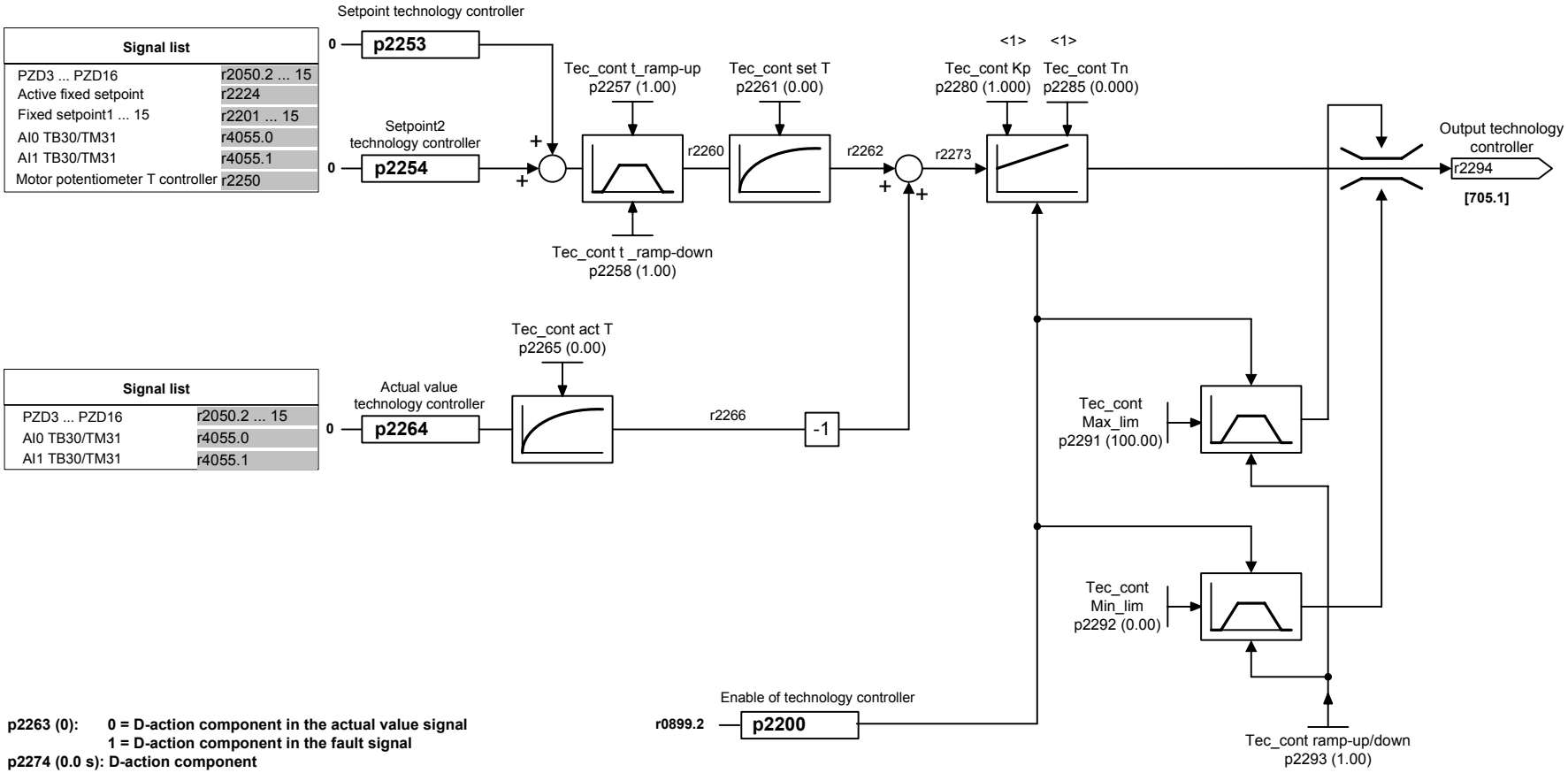
<1> p0610 = 0: only warning, without Imax reduction
p0610 = 1: fault and warning, with Imax reduction
p0610 = 2: fault and warning, without Imax reduction
<2> p0607 = 0 masks fault F07016 (on asynchronous machines).
<3> If no sensor is connected, the temperature is taken from the model.
<4> In the case of KTY, the calculated temperature is output; in the case of PTC, the temperatur calculated from the thermal motor model



1) p1300 ³ 20 -> vector controls
p1300 < 20 -> V/Hz characteristics

2) Only for vector control with sensor

1	2	3	4	5	6	7	8
Protection function					A5E00197559A AG	Function diagram	- 903 -
Block protection and stall protection - Chapter 9 of the Instruction Manual (OI)					**12.08.08**	SINAMICS G150	



<1> P, I, and D component can be deactivated by entering a zero.