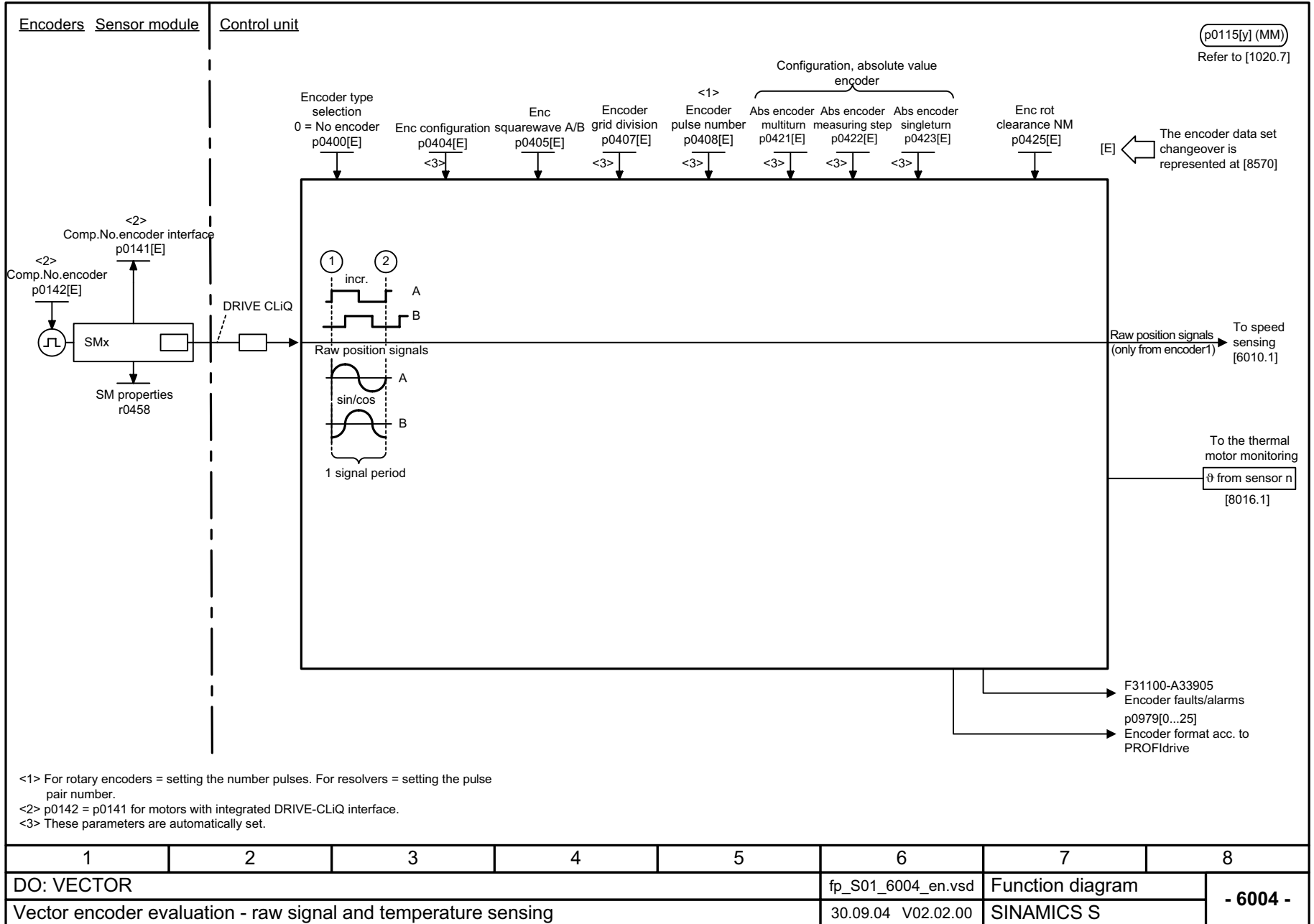


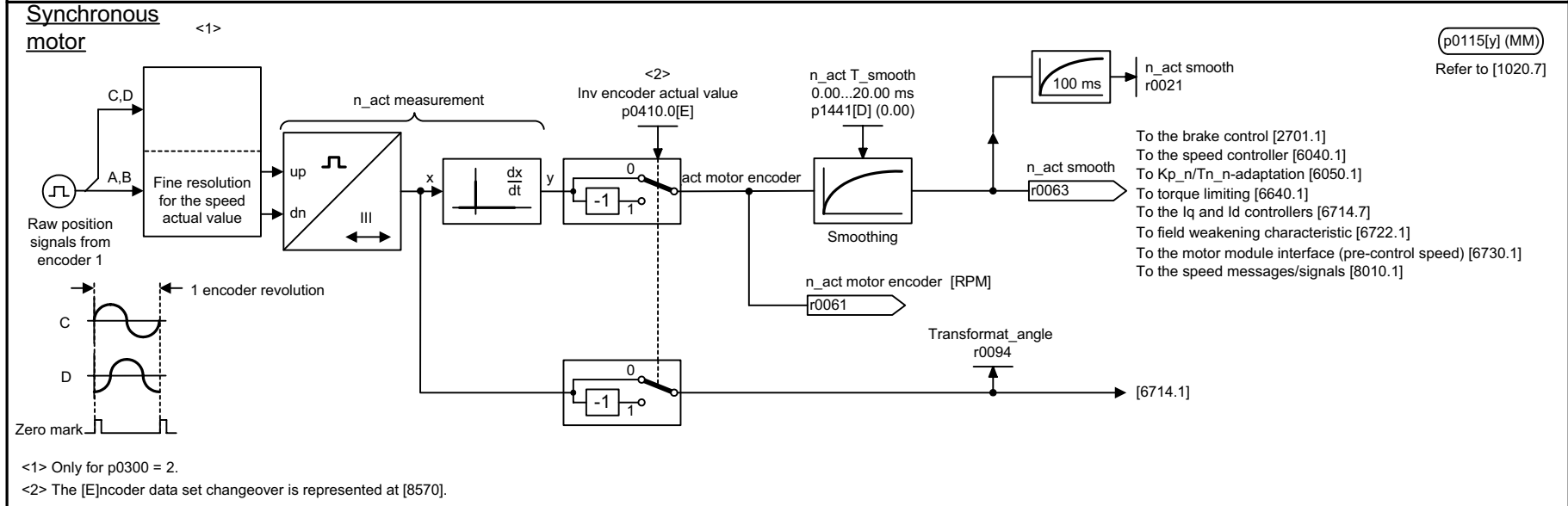
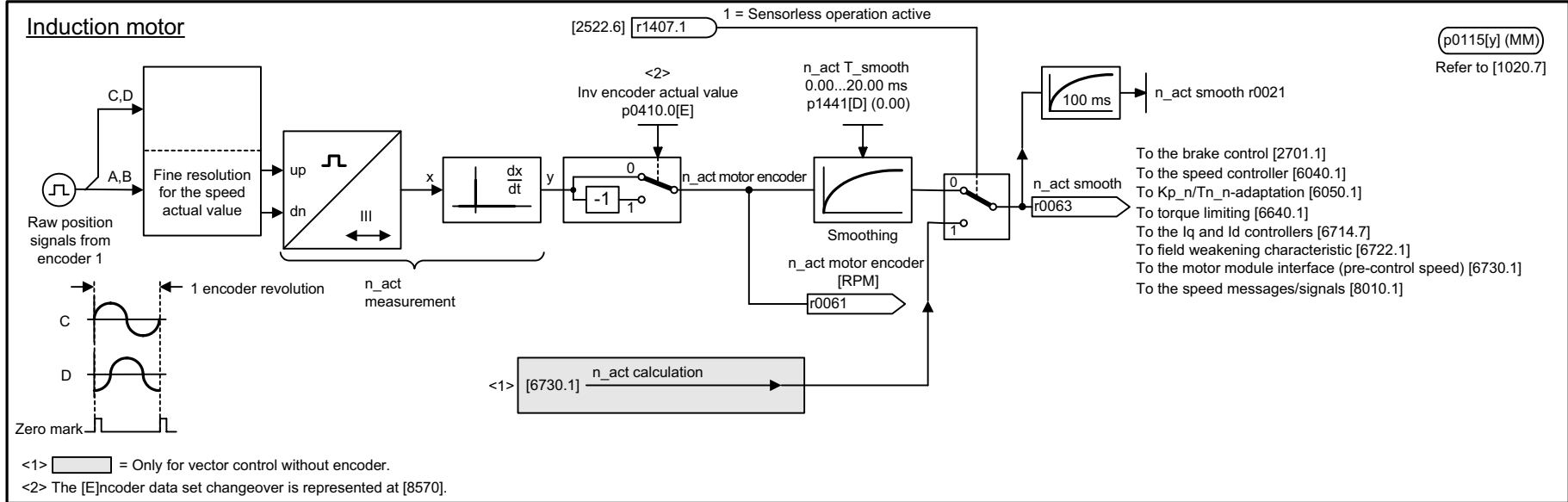
2.14 Vector control

Function diagrams

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Picture 2-111 6004 – Raw signal and temperature sensing

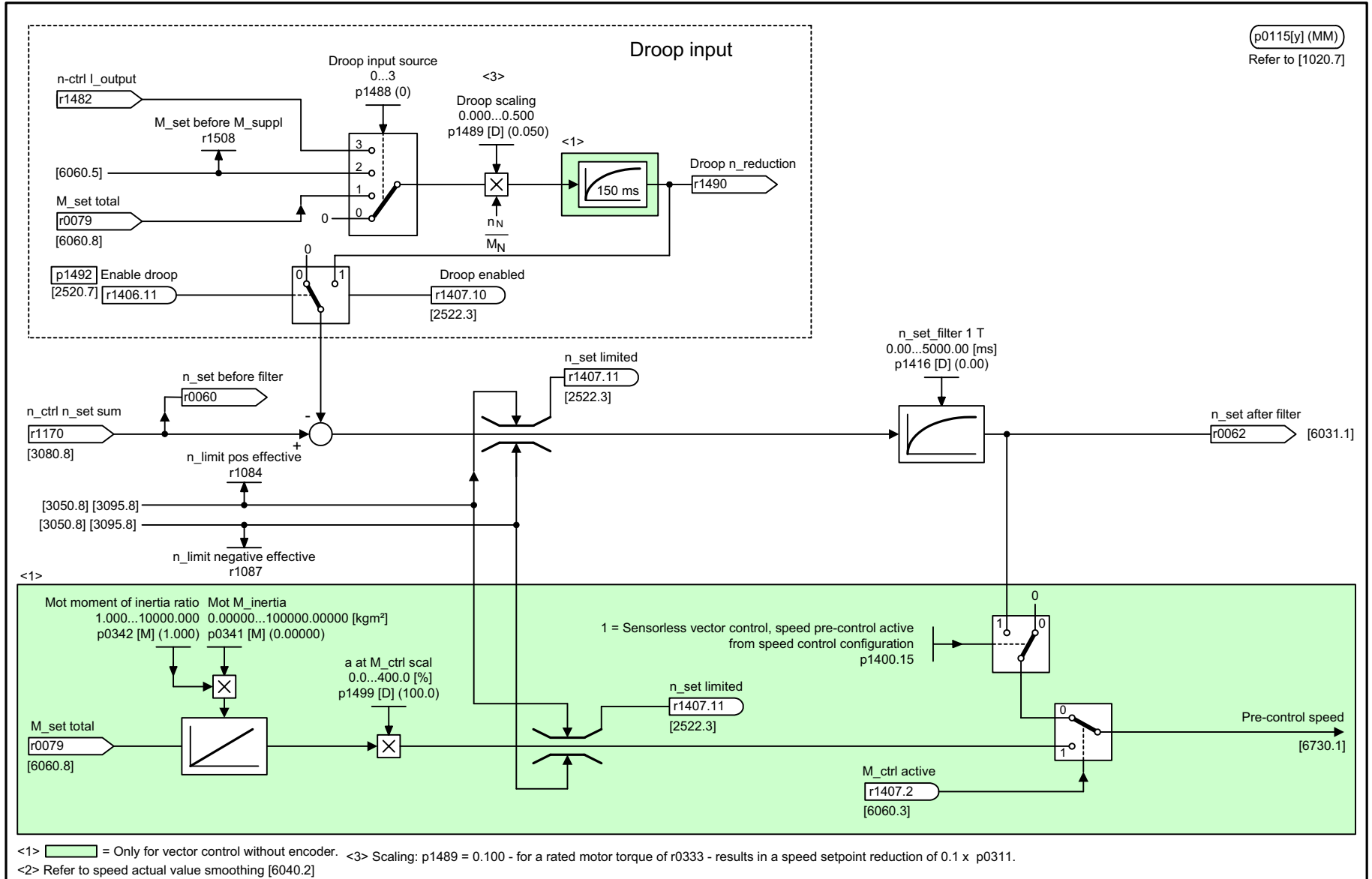




1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6010_en.vsd	Function diagram	
Vector encoder evaluation functions - speed actual value and rotor position sensing, motor encoder (encoder 1)					30.09.04 V02.02.00	SINAMICS S	
							- 6010 -

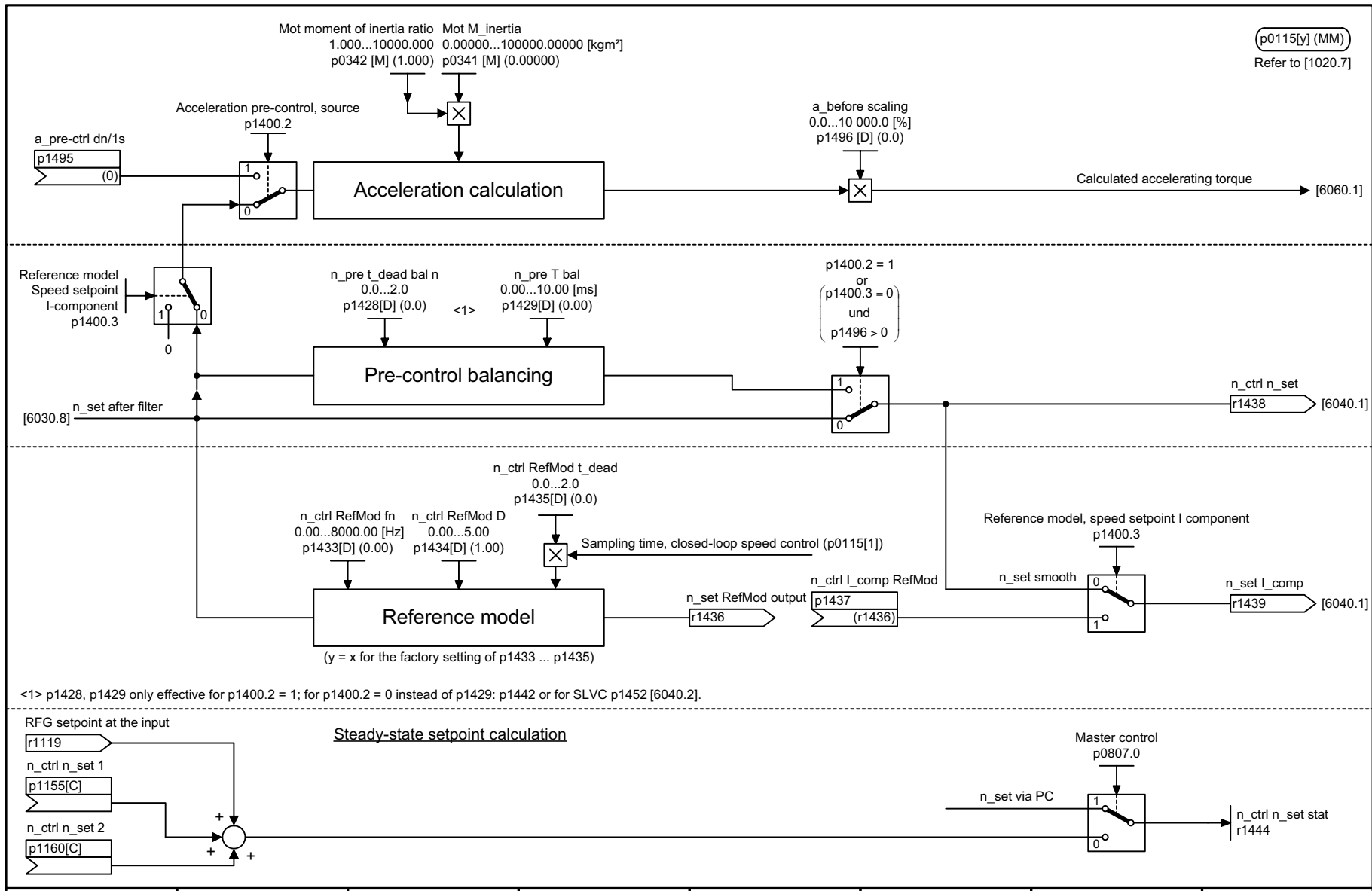
Picture 2-112 6010 – Speed actual value and rotor position sensing, motor encoder (encoder 1)

Picture 2-113 6030 – Speed setpoint, droop



Function diagrams
Vector control

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6030_en.vsd	Function diagram	
Vector speed control with/without encoder - speed setpoint, droop					30.09.04 V02.02.00	SINAMICS S	
							- 6030 -

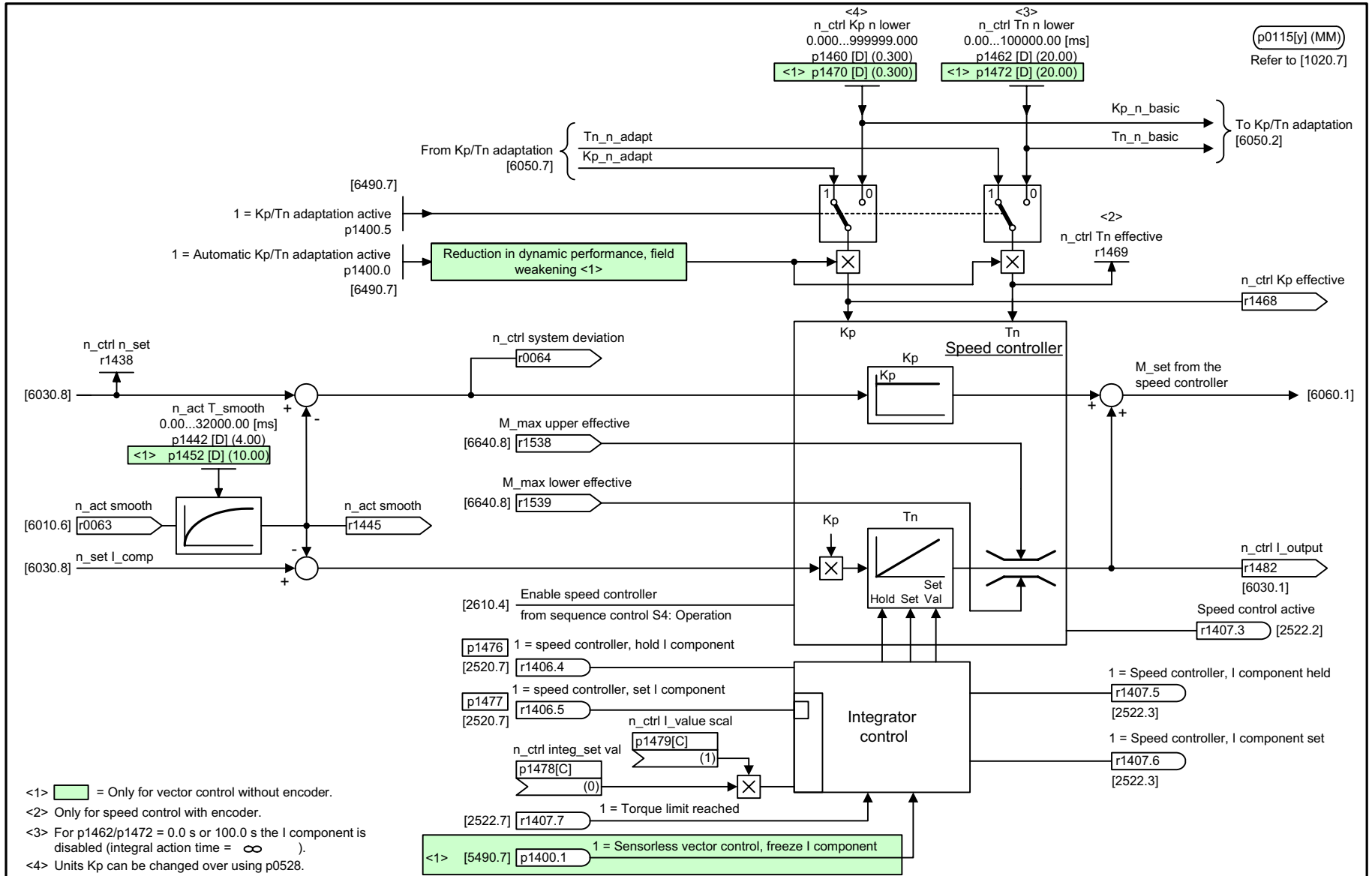


<1> p1428, p1429 only effective for p1400.2 = 1; for p1400.2 = 0 instead of p1429: p1442 or for SLVC p1452 [6040.2].

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6031_en.vsd	Function diagram	
Speed control with/without encoder - pre-control balancing			Reference/acceleration model		30.09.04 V02.02.00	SINAMICS S	
							- 6031 -

Picture 2-114 6031 – Pre-control balancing Reference/acceleration model

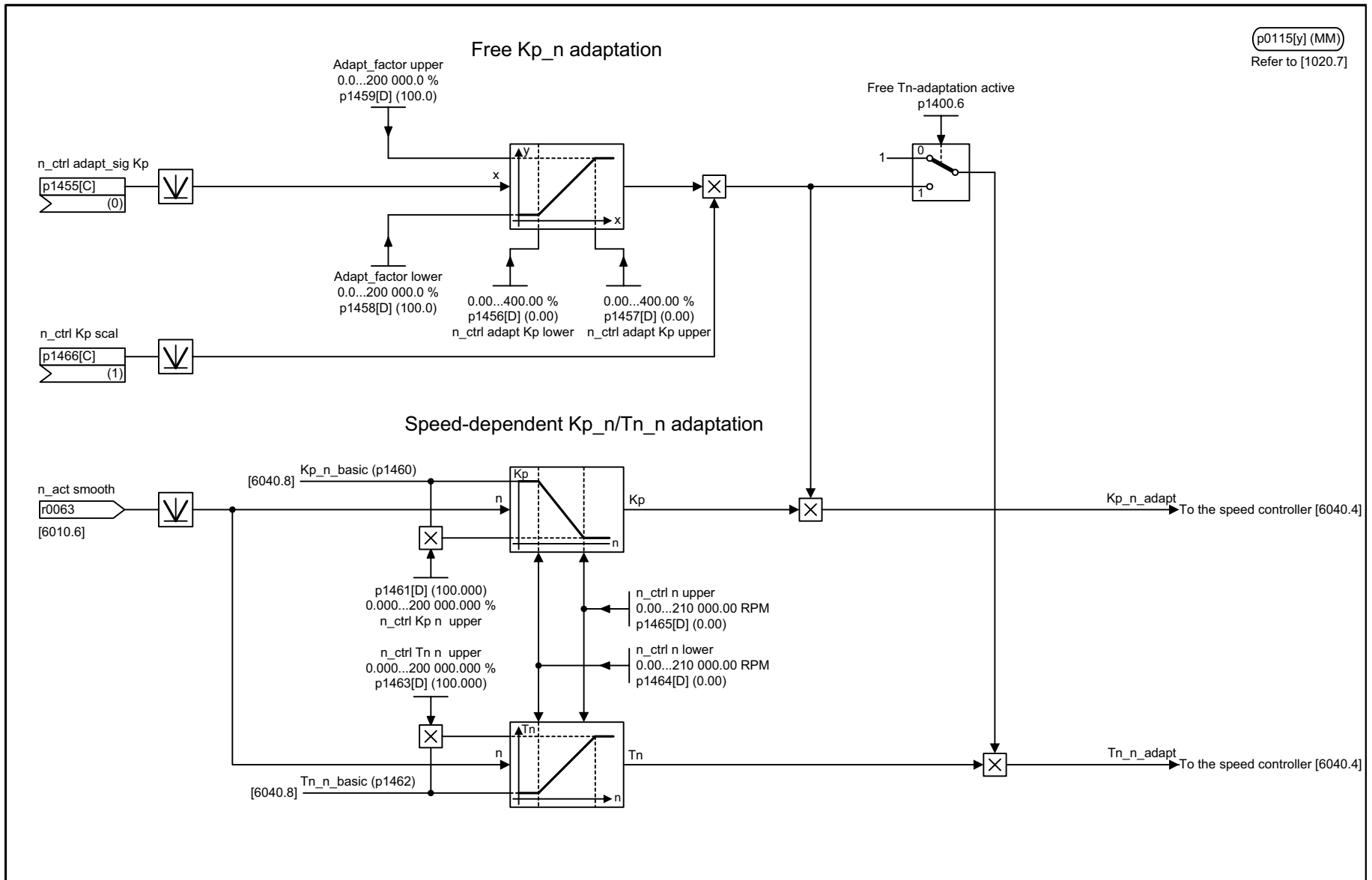
Picture 2-115 6040 – Speed control with/without encoder



Function diagrams
 Vector control

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6040_en.vsd	Function diagram	
Vector speed control with/without encoder - speed controller					21.10.04 V02.02.00	SINAMICS S	
							- 6040 -

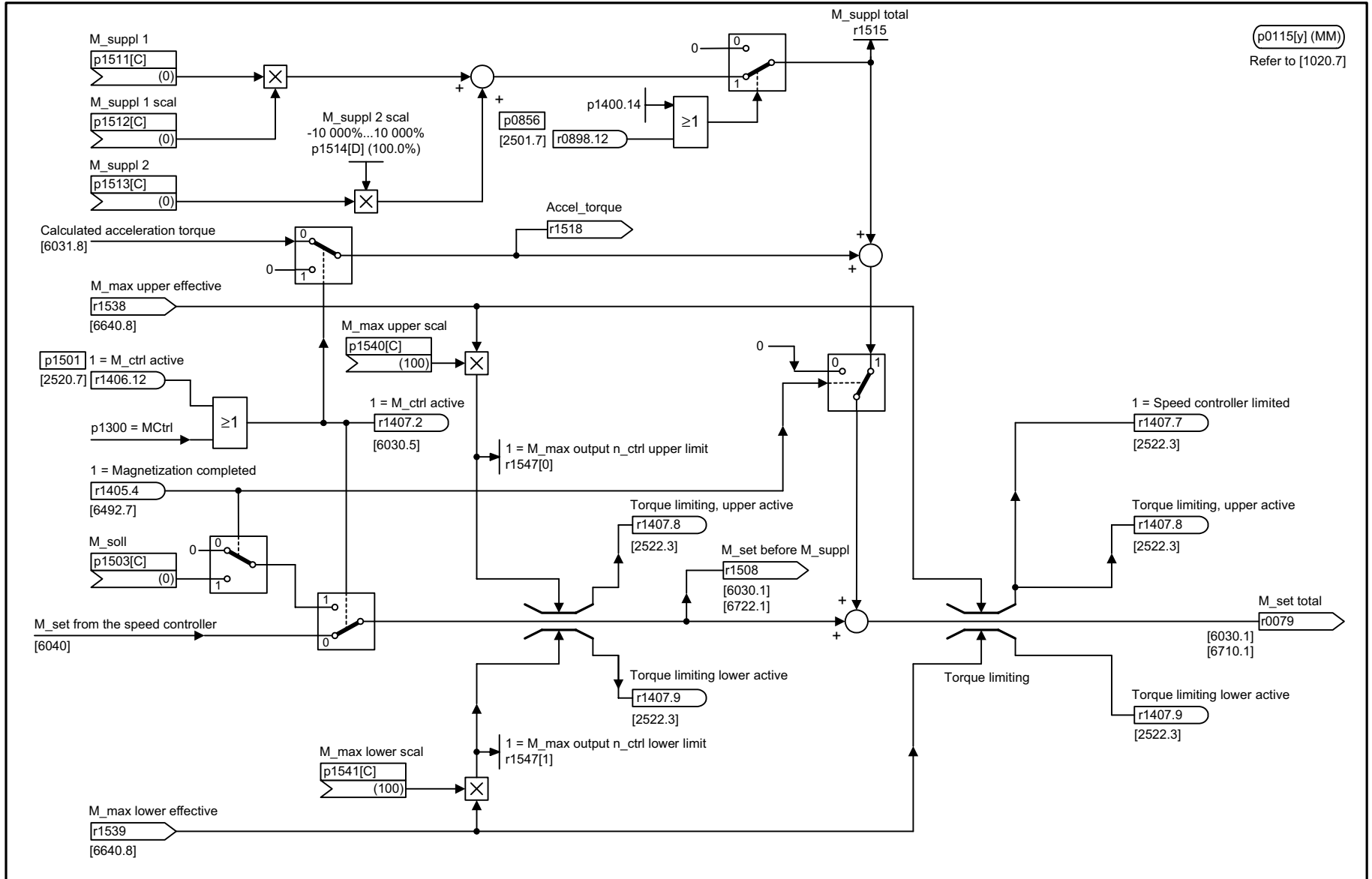
p0115[y] (MM)
Refer to [1020.7]



Picture 2-116 6050 – Kp_n-/Tn_n adaptation

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6050_en.vsd	Function diagram	
Vector, speed control with/without encoder - Kp_n/Tn_n adaptation					17.09.04 V02.02.00	SINAMICS S	
							- 6050 -

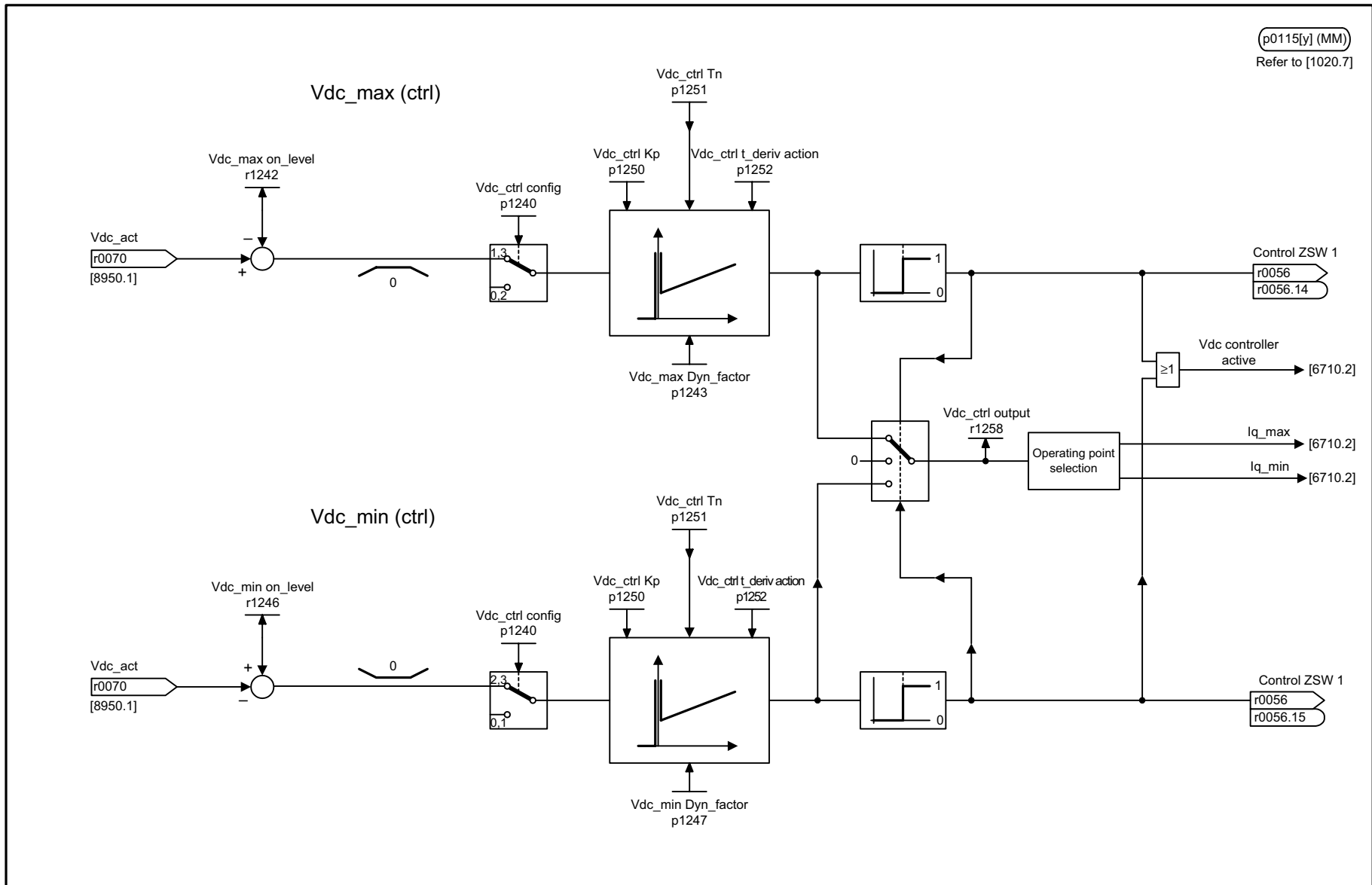
Picture 2-117 6060 – Torque setpoint



p0115[y] (MM)
 Refer to [1020.7]

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6060_en.vsd	Function diagram	
Vector speed control with encoder - torque setpoint					05.10.04 V02.02.00	SINAMICS S	
							- 6060 -

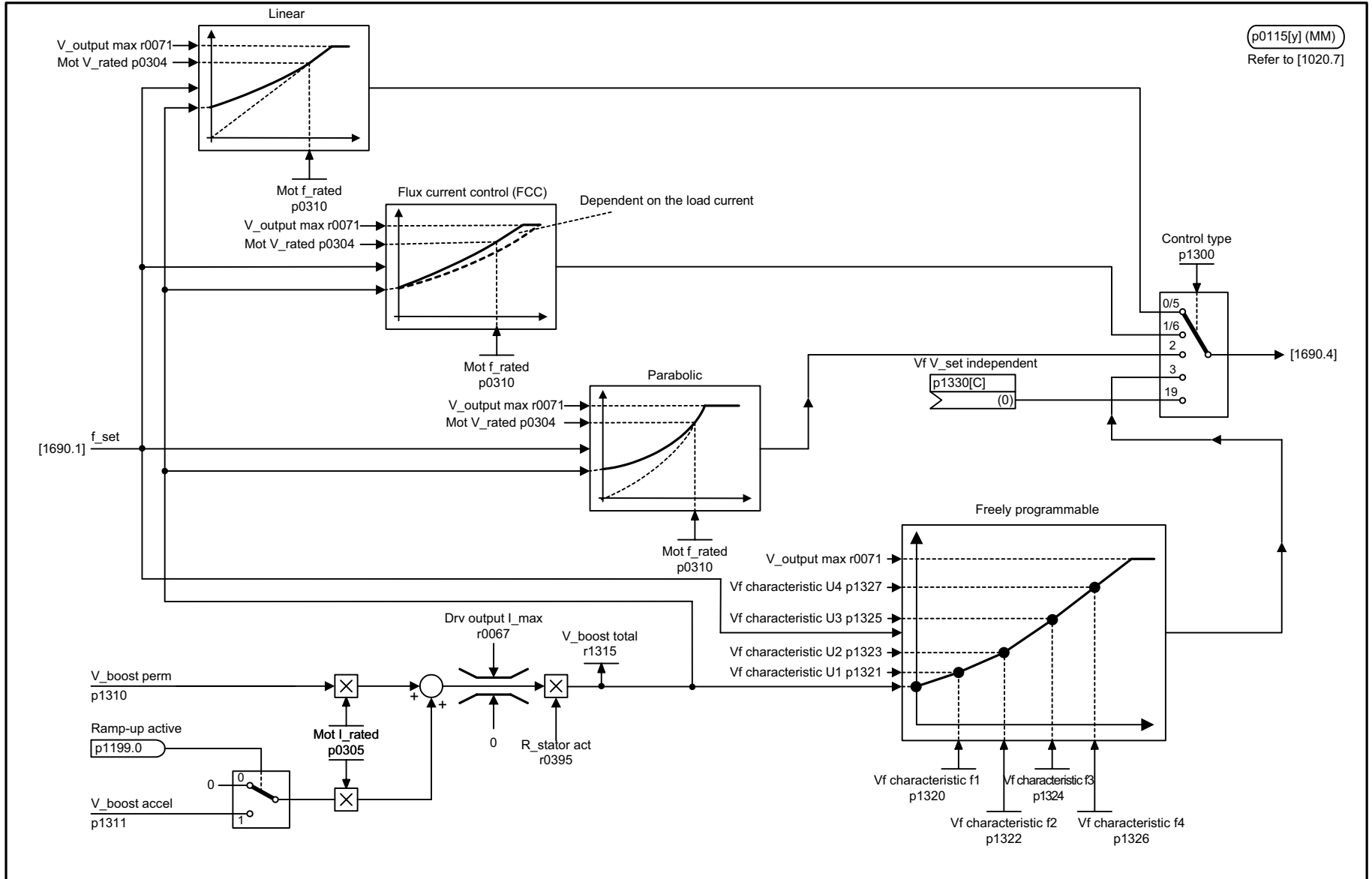
(p0115[y] (MM)
Refer to [1020.7]



Picture 2-118 6220 – Vdc_max controller and Vdc_min controller

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6220_en.vsd	Function diagram	
Vector control - Vdc_max controller and Vdc_min controller					14.06.04 V02.02.00	SINAMICS S	
							- 6220 -

Picture 2-119 6300 – V/f characteristic and voltage boost

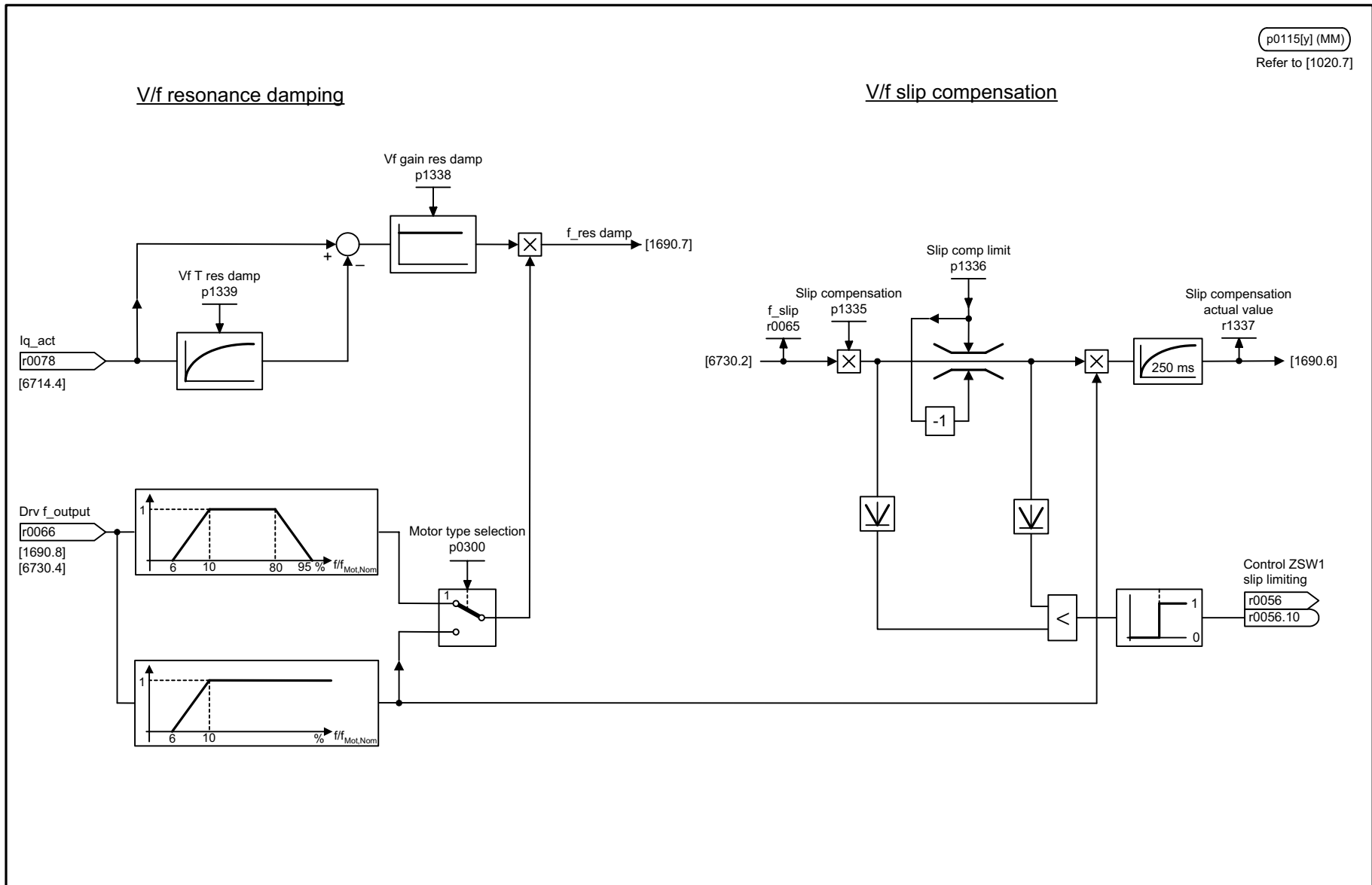


p0115[y] (MM)
Refer to [1020.7]

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6300_en.vsd	Function diagram	
Vector V/f control - V/f characteristic and voltage boost					16.07.04 V02.02.00	SINAMICS S	
							- 6300 -

Function diagrams
Vector control

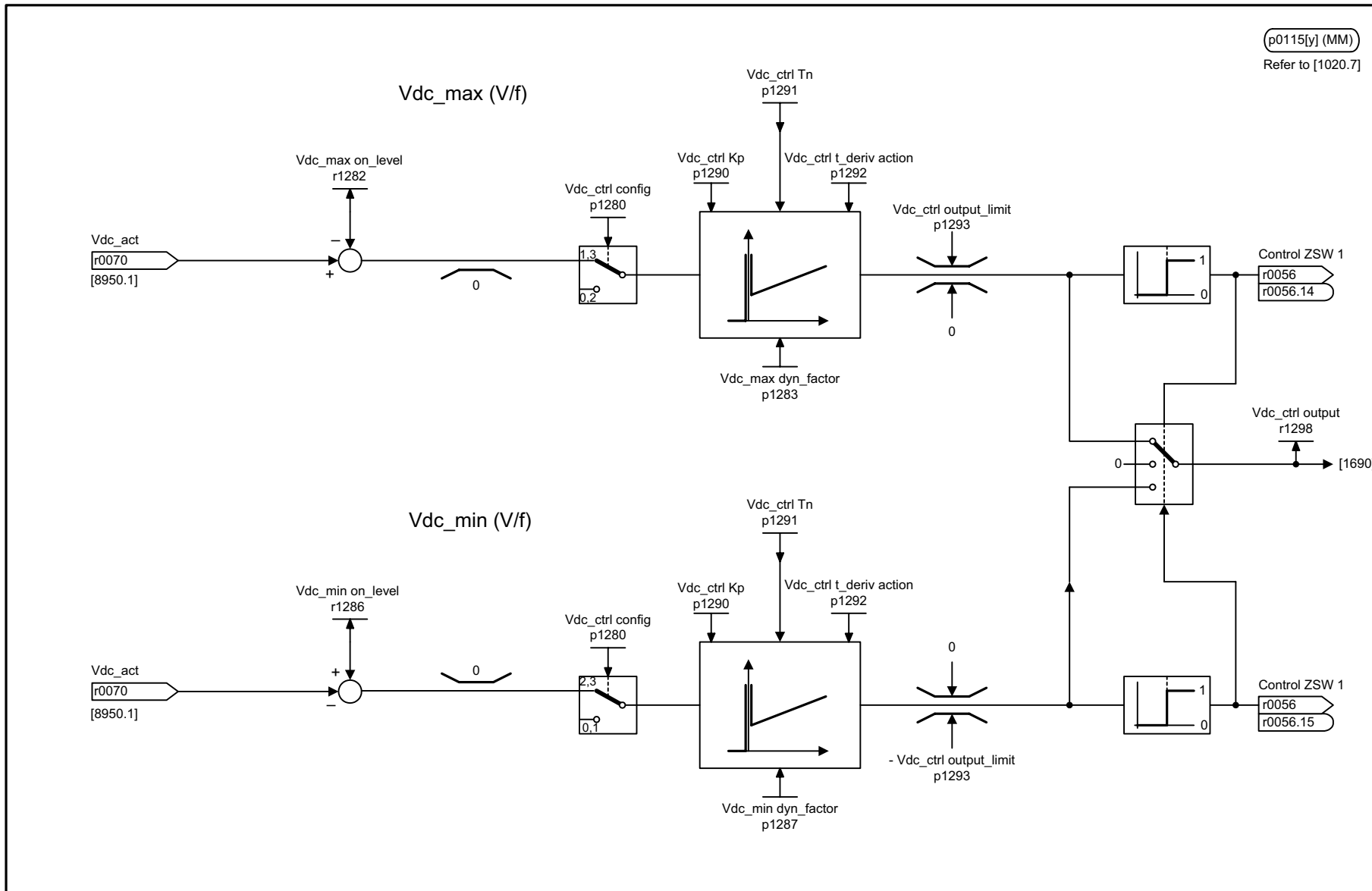
p0115[y] (MM)
Refer to [1020.7]



Picture 2-120 6310 – Resonance damping and slip compensation

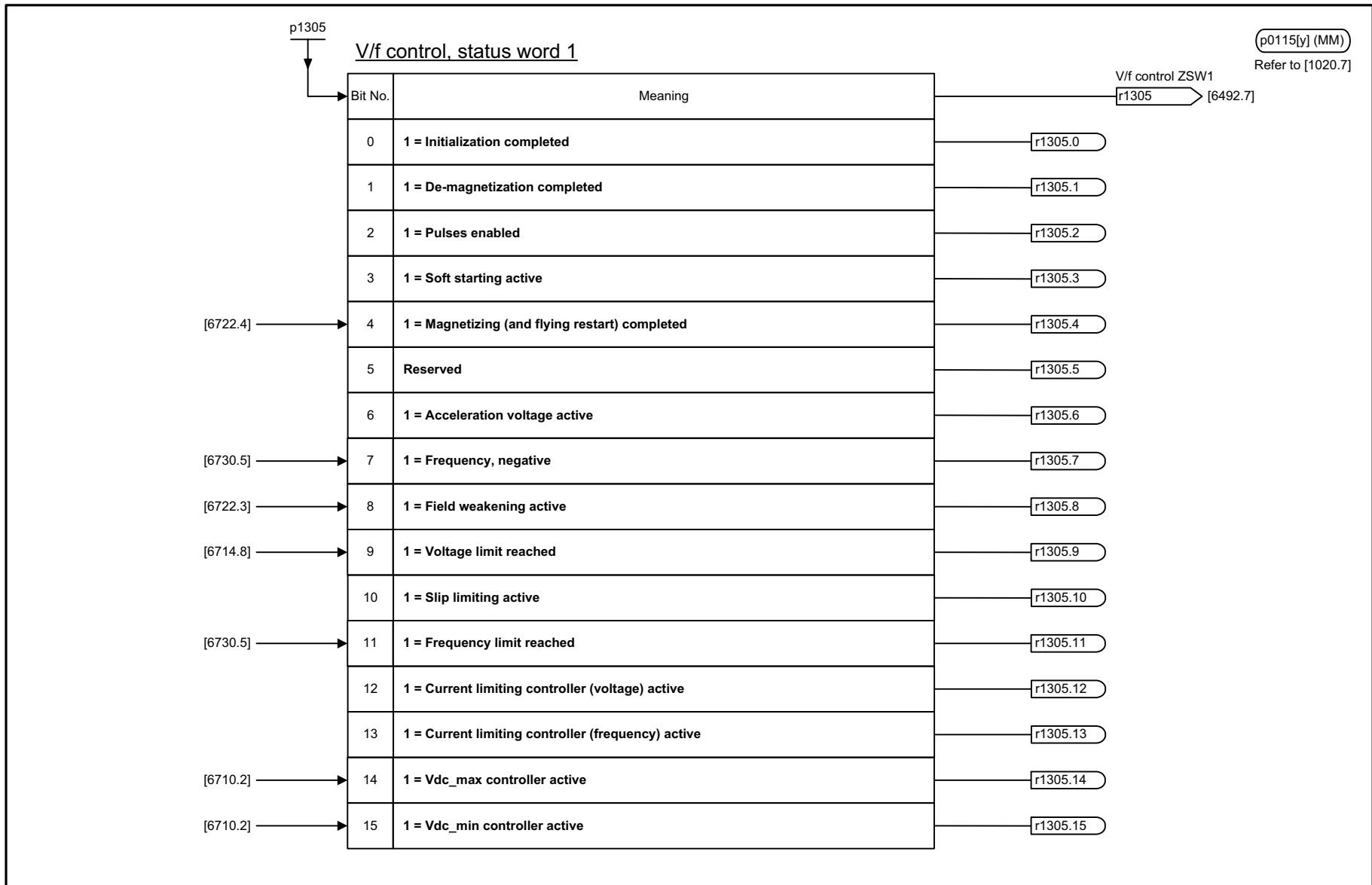
1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6310_en.vsd	Function diagram	
Vector V/f control - resonance damping and slip compensation					30.09.04 V02.02.00	SINAMICS S	
							- 6310 -

Picture 2-121 6320 – Vdc_max controller and Vdc_min controller



p0115[y] (MM)
 Refer to [1020.7]

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6320_en.vsd	Function diagram	
Vector V/f control - Vdc_max controller and Vdc_min controller					16.07.04 V02.02.00	SINAMICS S	
							- 6320 -



Picture 2-122 6489 – V/f control status word 1

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6489_en.vsd	Function diagram	
Vector open-loop - closed-loop control/status word - V/f control, status word 1					30.09.04 V02.02.00	SINAMICS S	
- 6489 -							

p0115[y] (MM)
Refer to [1020.7]

Bit No.	Meaning	Factory setting
0	1 = Automatic Kp/Tn adaptation active	0 → [6040.3]
1	1 = Sensorless vector control, freeze I component	0
2	1 = Acceleration pre-control, external source (p1495) 0 = Internal acceleration pre-control (n_set)	
3	1 = Reference model, speed setpoint I component ON	
4	Reserved	
5	1 = Kp/Tn adaptation active	1 → [6040.3]
6	Reserved	
7	Reserved	
8	Reserved	
9	Reserved	
10	Reserved	
11	Reserved	
12	Reserved	
13	Reserved	
14	1 = Torque pre-control always active 0 = Torque pre-control for n_ctrl enable	0
15	1 = Sensorless vector control, speed pre-control active	1 → [6030.5]

n_ctrl config
p1400[D]

p1400[D]

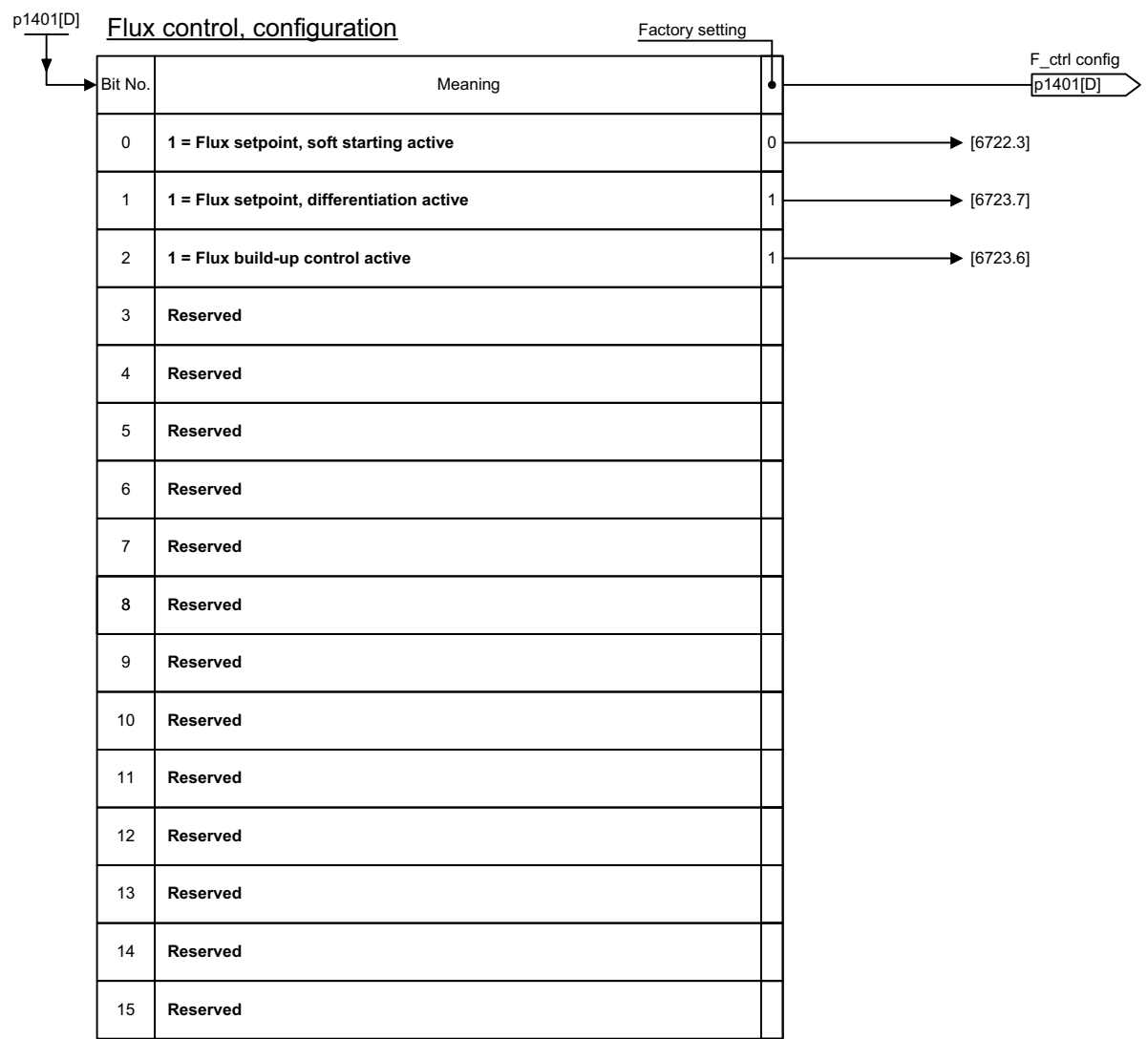
Speed control configuration

Factory setting

Picture 2-123 6490 – Speed control configuration

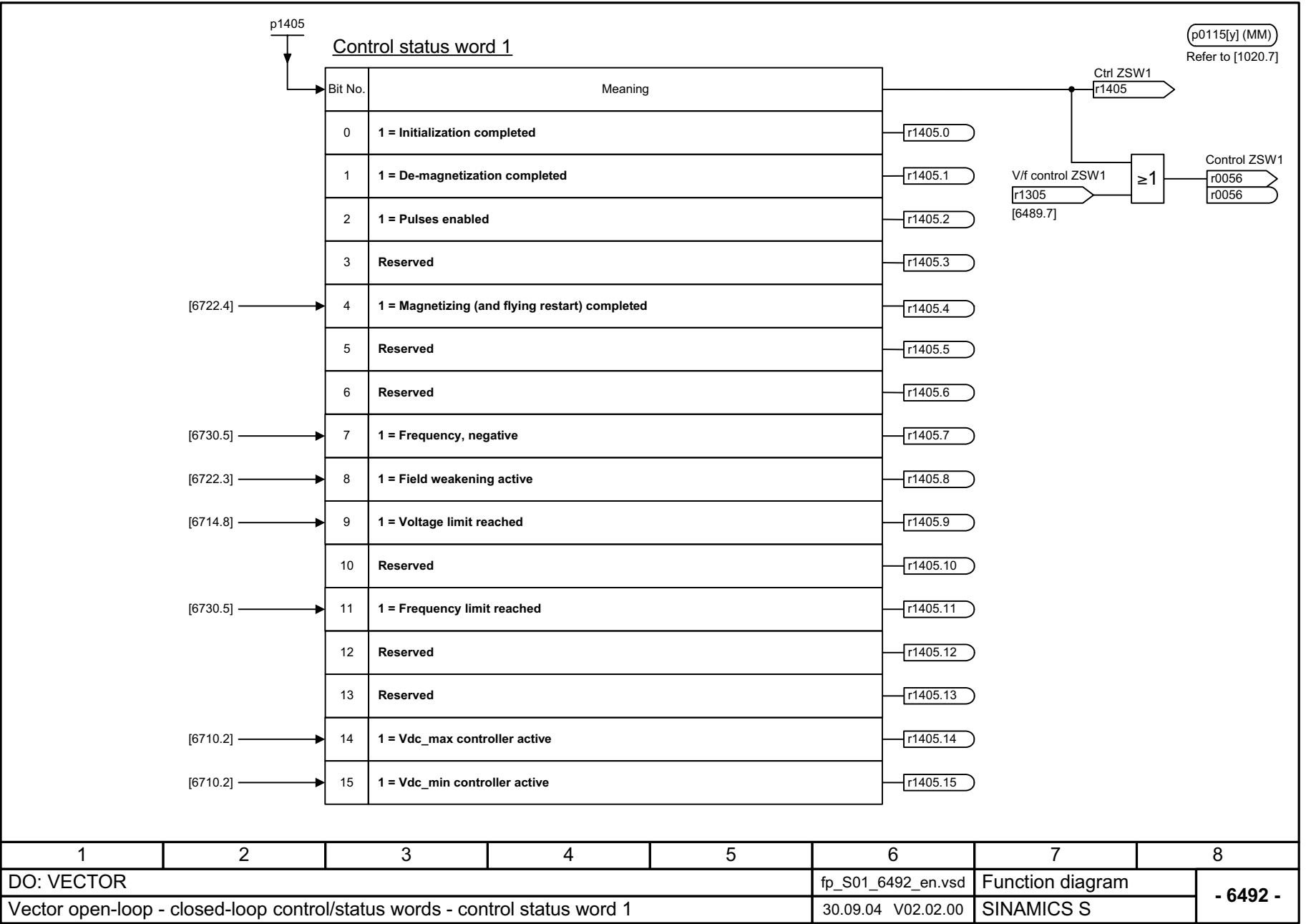
1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6490_en.vsd	Function diagram	
Vector open-loop - closed-loop control status words - speed control configuration					29.09.04 V02.02.00	SINAMICS S	
- 6490 -							

p0115[y] (MM)
Refer to [1020.7]



Picture 2-124 6491 – Flux control configuration

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6491_en.vsd	Function diagram	
Vector open-loop - closed-loop control status words - flux control configuration					03.08.04 V02.02.00	SINAMICS S	
- 6491 -							



Picture 2-125 6492 – Control status word 1

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6492_en.vsd	Function diagram	
Vector open-loop - closed-loop control/status words - control status word 1					30.09.04 V02.02.00	SINAMICS S	
							- 6492 -

p0115[y] (MM)
Refer to [1020.7]

Control status word 3 (for current control)

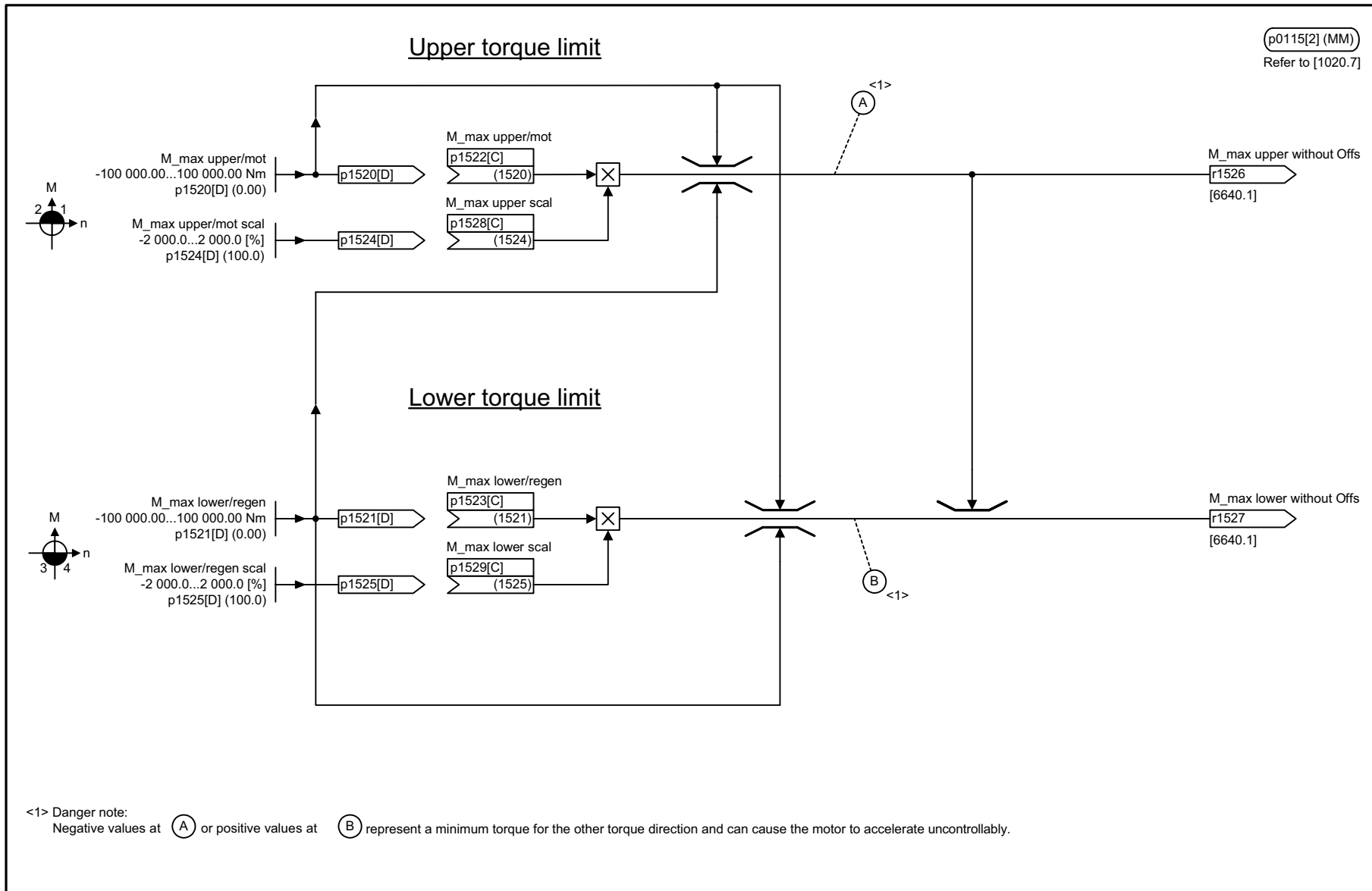
Bit No.	Meaning
0	1 = Current control active
[6714.5] → 1	1 = Lim. I-comp. Id-ctrl active
2	Reserved
[6714.7] → 3	1 = V limiting active
4	Reserved
5	Reserved
6	Reserved
7	Reserved
8	Reserved
9	Reserved
[6730.3] → 10	1 = Lim. EMF/Obs-ctrl. active
11	1 = Error EMF/Obs-N active
12	1 = Motor stalled active
13	Reserved
14	Reserved
15	Reserved

Ctrl ZSW3
r1408

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6493_en.vsd	Function diagram	
Vector open-loop - closed-loop control/status words - control status word 3					30.09.04 V02.02.00	SINAMICS S	
- 6493 -							

Picture 2-126 6493 – Control status word 3

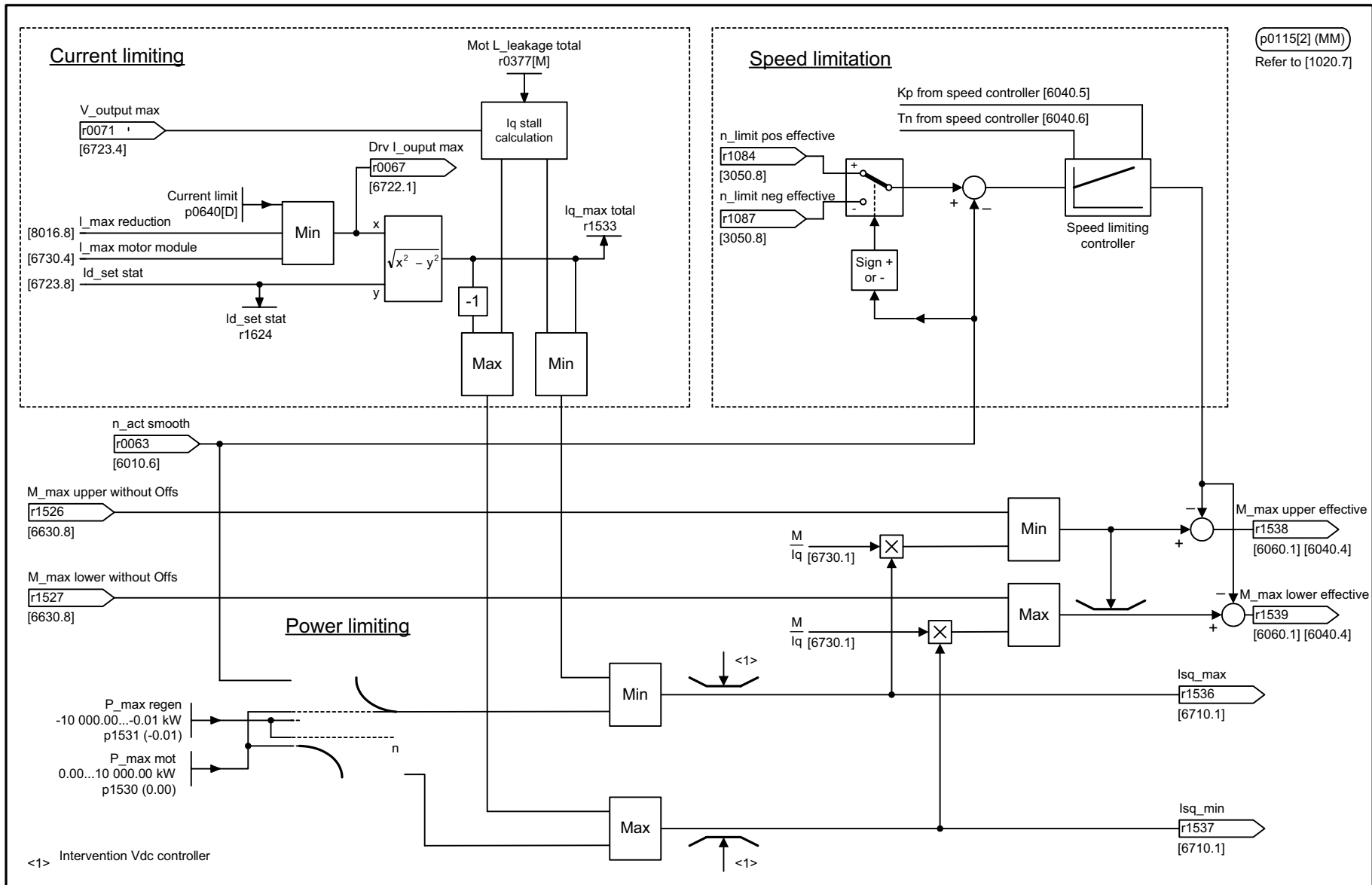
Picture 2-127 6630 – Upper/lower torque limit



Function diagrams
 Vector control

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6630_en.vsd	Function diagram	
Generating torque limits - upper/lower torque limit					01.09.04 V02.02.00	SINAMICS S	
							- 6630 -

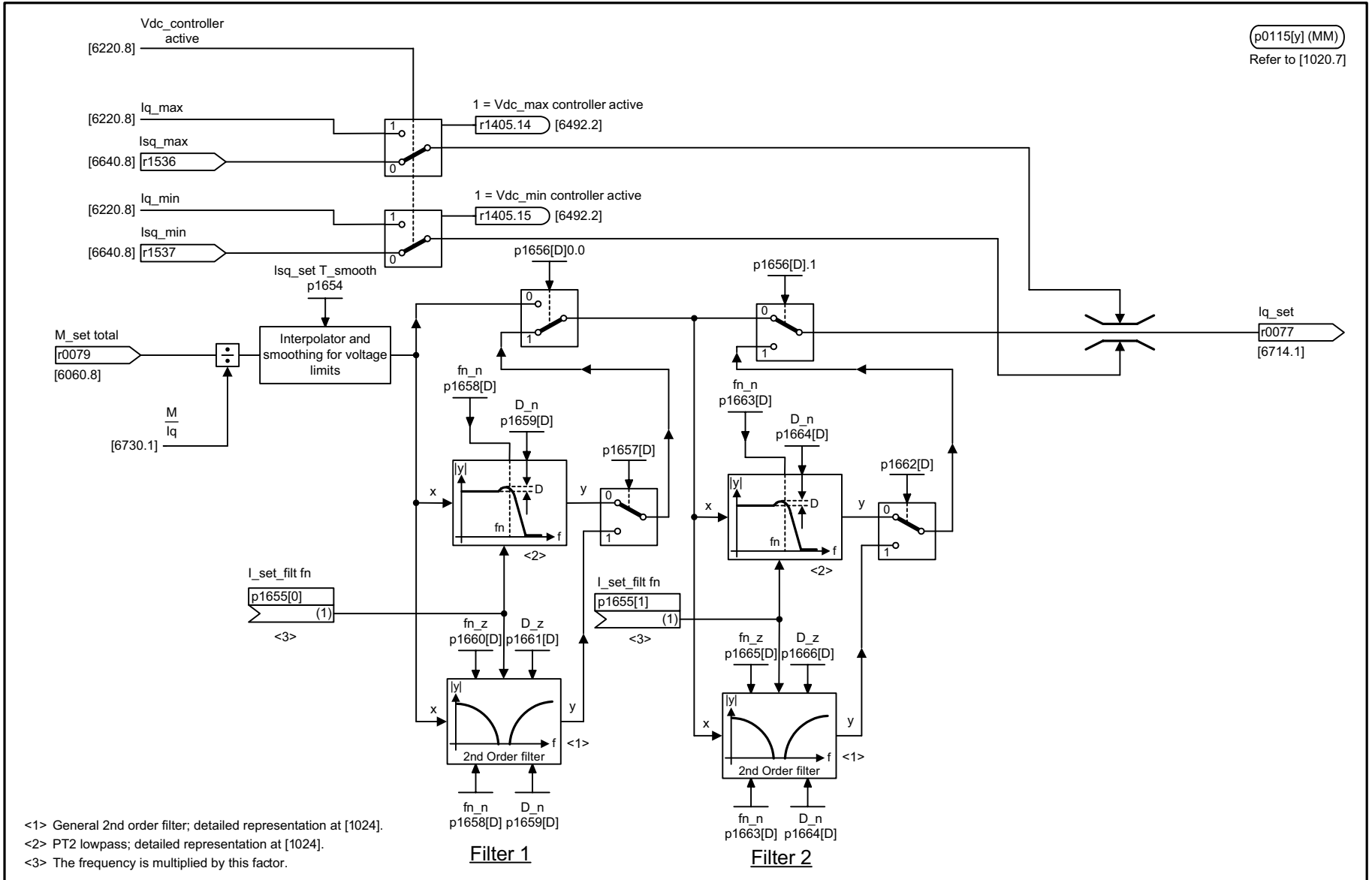
p0115[2] (MM)
Refer to [1020.7]



1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6640_en.vsd	Function diagram	
Generating torque limits - current/power/torque limits					05.10.04 V02.02.00	SINAMICS S	
							- 6640 -

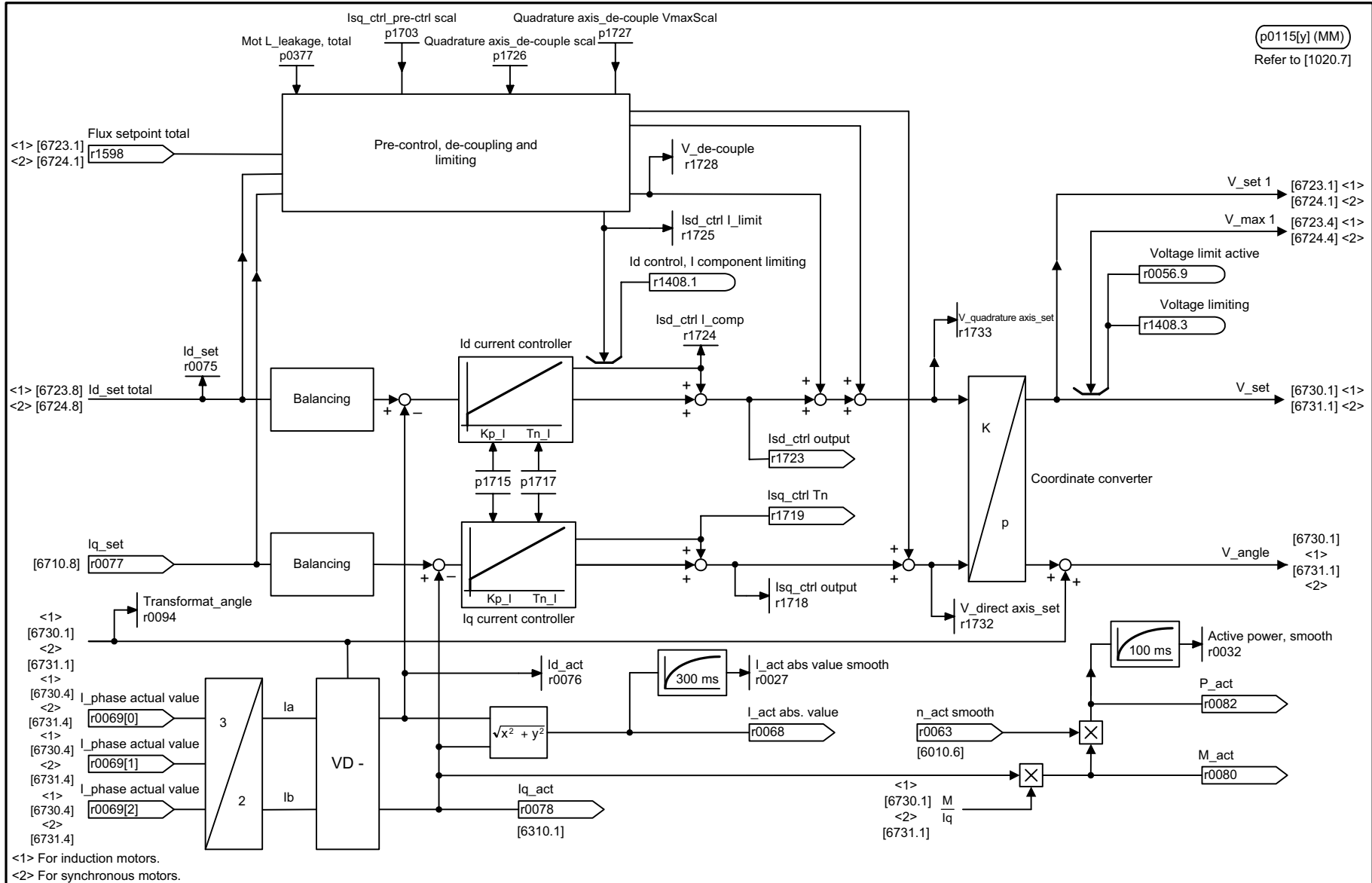
Picture 2-128 6640 – Current/power/torque limits

Picture 2-129 6710 – Current setpoint filter



p0115[y] (MM)
 Refer to [1020.7]

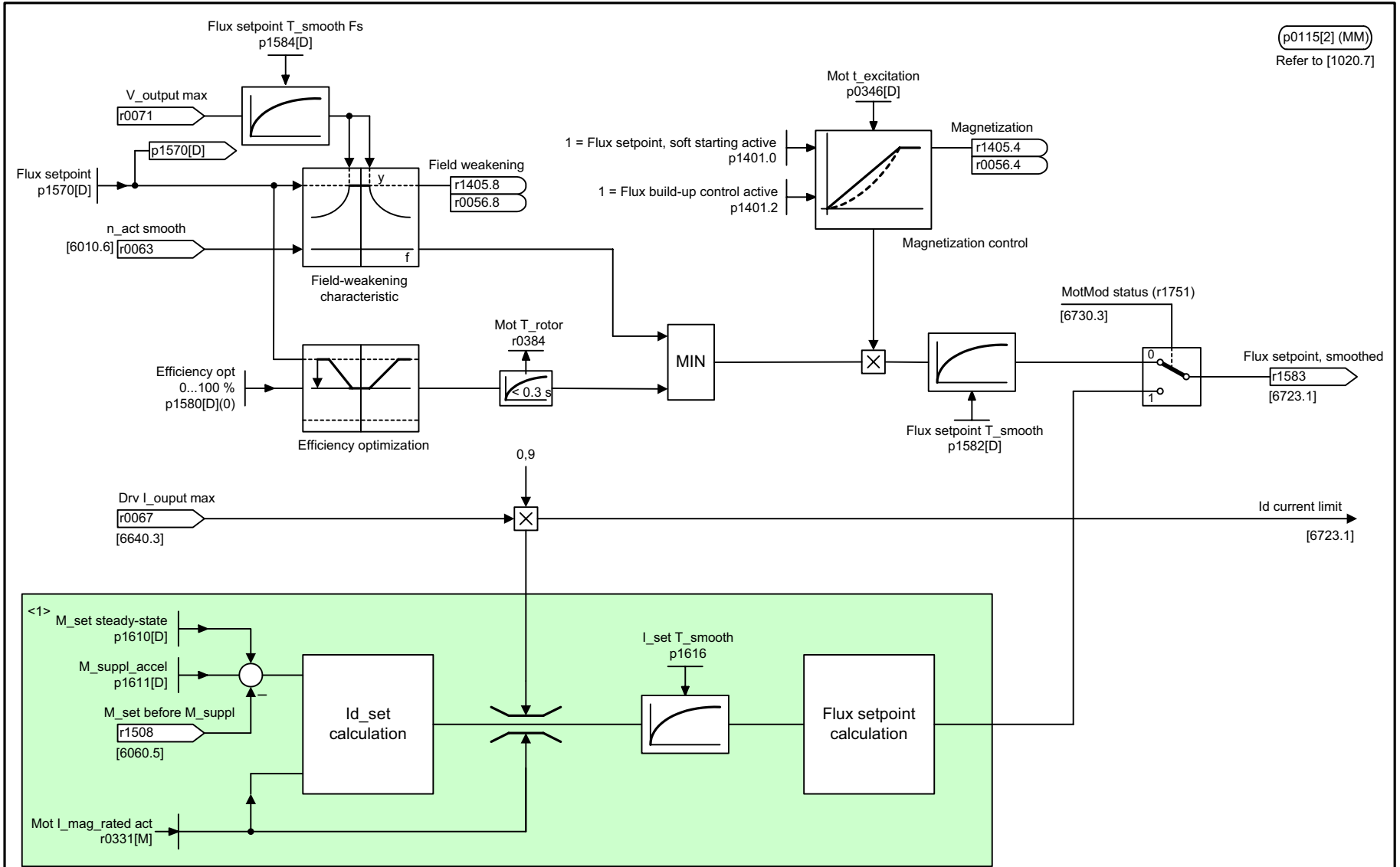
1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6710_en.vsd	Function diagram	
Vector current control - current setpoint filter					05.10.04 V02.02.00	SINAMICS S	
							- 6710 -



1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6714_en.vsd	Function diagram	
Vector current control - Iq and Id controllers					21.10.04 V02.02.00	SINAMICS S	
							- 6714 -

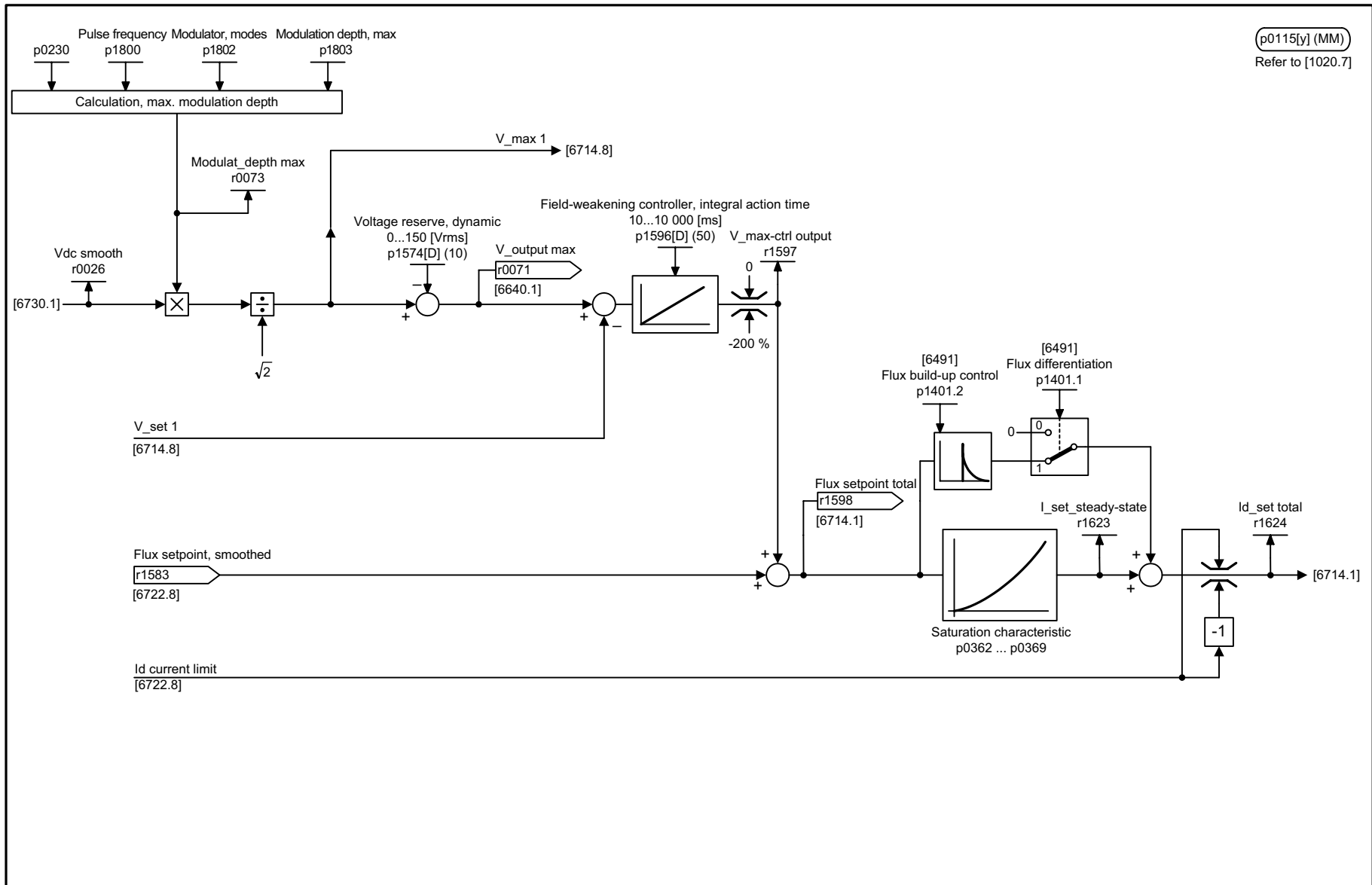
Picture 2-130 6714 - Iq and Id controllers

Picture 2-131 6722 – Field weakening characteristic, Id setpoint



<1> Only for vector control without encoder (SLVC).

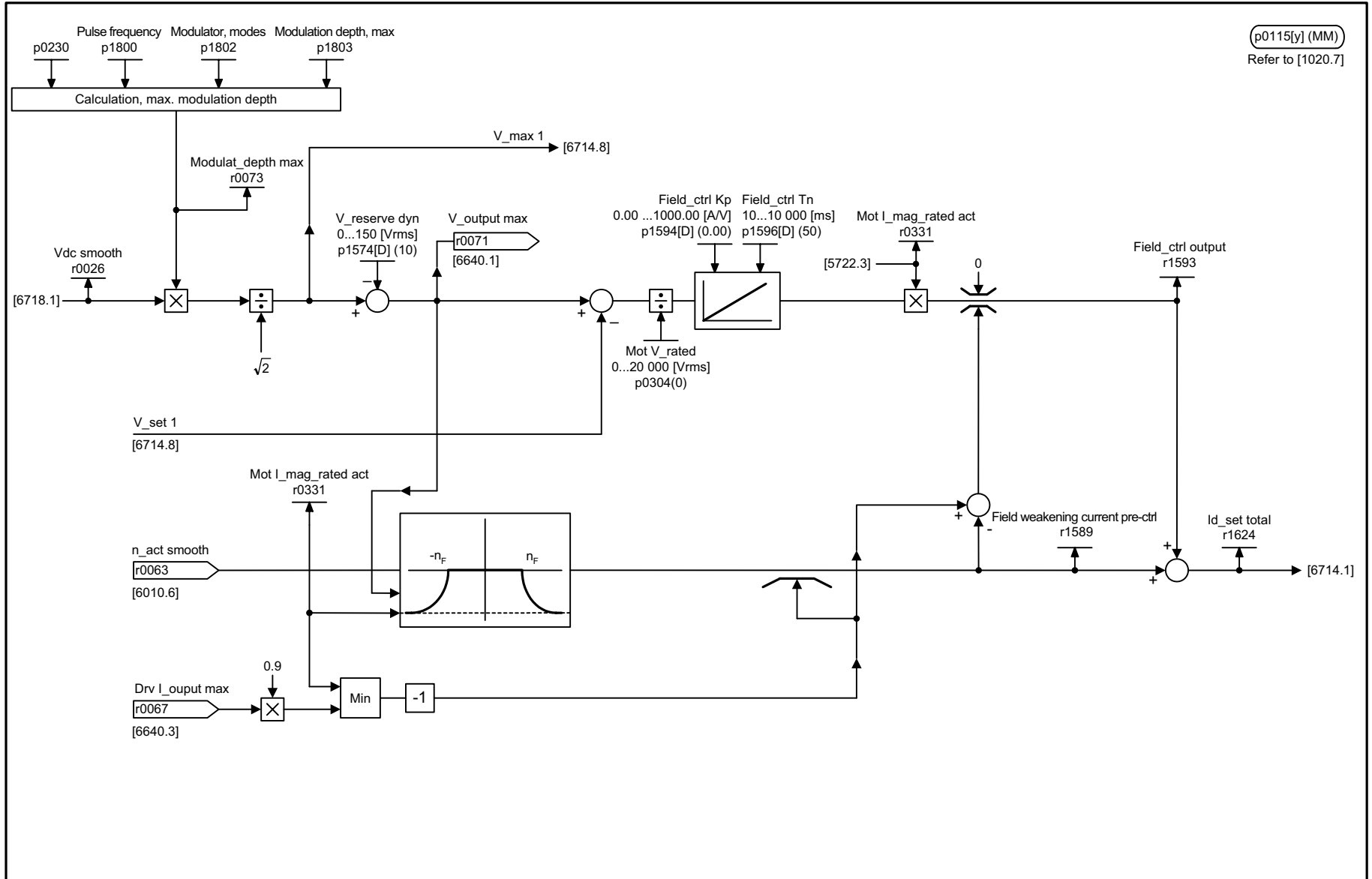
1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6722_en.vsd	Function diagram	
Vector current control - field weakening characteristic, Id setpoint					01.10.04 V02.02.00	SINAMICS S	
							- 6722 -



1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6723_en.vsd	Function diagram	
Vector current control - field weakening controller, flux controller for induction motors (p0300 =1)					01.10.04 V02.02.00	SINAMICS S	
							- 6723 -

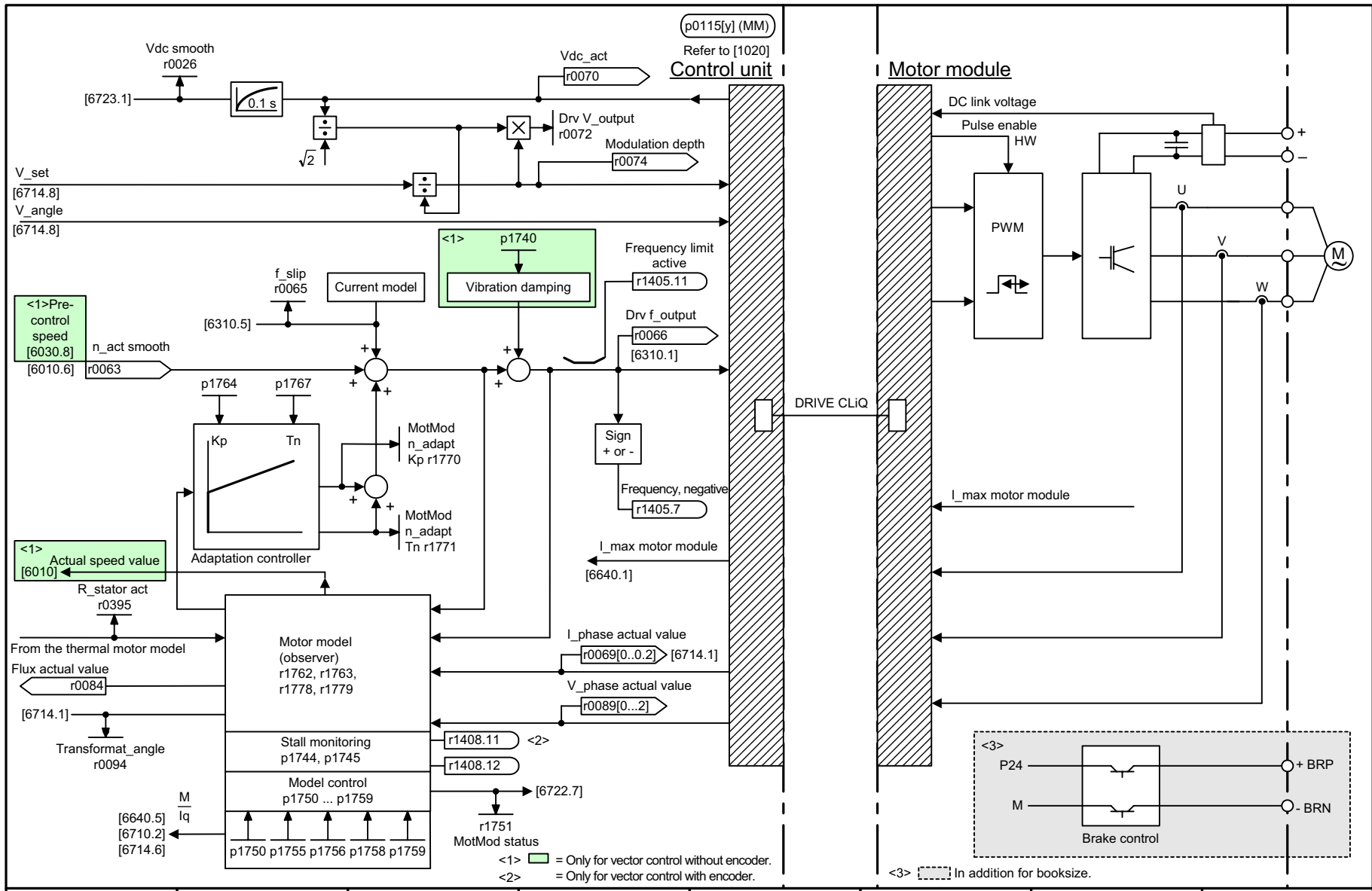
Picture 2-132 6723 – Field weakening controller, flux controller for induction motors (p0300 = 1)

Picture 2-133 6724 – Field weakening controller for synchronous motors (p0300 = 2)



p0115[y] (MM)
 Refer to [1020.7]

1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6724_en.vsd	Function diagram	
Vector current control - field weakening controller for synchronous motors (p0300 = 2)					30.06.04 V02.02.00	SINAMICS S	
							- 6724 -



1	2	3	4	5	6	7	8
DO: VECTOR					fp_S01_6730_en.vsd	Function diagram	
Vector current control - interface to the motor module for induction motors (p0300 = 1)					04.10.04 V02.02.00	SINAMICS S	
							- 6730 -

Picture 2-134 6730 – Interface to the motor module for induction motors (p0300 = 1)

Picture 2-135 6731 – Interface to the motor module for a synchronous motor (p0300 = 2)

