

6.4 Input/output terminals of the control board

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6.4.1 Permanently-connected input terminals

Table 6-43 Permanently-connected input terminals

Terminal		Function	Description
Drive A	Drive B		
663 X431.4		Pulse enable, module-specific	<p>The inverter is enabled (motor control), if the enable voltage is available at the following terminals:</p> <ol style="list-style-type: none"> 1. Terminal 63 (pulse enable, group-specific, at the NE and monitoring module) 2. Terminal 64 (controller enable, group-specific, at the NE or monitoring module) 3. Terminal 48 (contactor control, at the NE module) 4. Terminal 663 (pulse enable, board-specific) 5. Terminal 65.x (controller enable, axis-specific) <p>If terminal 663 is opened while the motor is rotating, the inverter is immediately (< 1 ms) inhibited, and the motors connected to this module coast down in a no-current condition.</p> <p>If the module is enabled using terminal 663, then the enable operation takes approx. 20 ms.</p>
65.A X451.5	65.B X452.5	Axis-specific controller enable	<p>The controller enable is dependent on the following enable signals:</p> <ol style="list-style-type: none"> 1. Terminal 63 (pulse enable, group-specific, at the NE and monitoring module) 2. Terminal 64 (controller enable, group-specific, at the NE or monitoring module) 3. Terminal 663 (pulse enable, board-specific) 4. Terminal 65.x (controller enable, axis-specific) 5. RFG, fault drive x (internal enable signal) 6. PROFIBUS enable signals <p>If the associated terminal 65.x is opened while the motor is rotating, then the drive brakes along the ramp-function generator ramp.</p> <p>If the n_{\min} threshold (P1403) is exceeded (as absolute value), or after the pulse cancellation timer has expired (P1404), the inverter is inhibited (pulses canceled), and the motor is shutdown without any overshoot.</p>
<p>Note:</p> <ul style="list-style-type: none"> • x: Space retainer for drive A or B • If the enable signals are missing, which are required to operate the drive, these can be determined using P0600 (operating display) (refer to Chapter 4.5). 			

6.4.2 Freely-parameterizable digital input terminals

Description

There are 4 freely parameterizable input terminals for every axis.

A terminal is parameterized by entering the appropriate required function number into the assigned parameter.

Which function numbers are available? --> Refer to Chapter 6.4.3

Note

- Rules when assigning input terminals a multiple number of times
The terminals are evaluated in the following sequence:
I0.x - I1.x - I2.x - I3.x - I4 - I5 - ... - I11
If a function is assigned a multiple number of times to an input terminal, influence is only possible using the "last" terminal assigned this particular function.
- Rule regarding hardware terminal and PROFIBUS signal
The hardware terminal has priority over the PROFIBUS signal, this means that a signal via a terminal always has priority over the "same" PROFIBUS signal.

Notice

The terminals may only be parameterized when the drive pulses are canceled.

If terminal functions are activated, however, are not connected-up, then the "0" signal is effective.

Overview of the terminals and parameters

There is the following assignment between terminals, drives and parameters:

Table 6-44 Overview of the freely-parameterizable input terminals

Terminal				Parameter						
Drive A		Drive B		No.	Name	Min.	Standard	Max.	Unit	Effective
I0.A	X451.7	I0.B	X452.7	0660	Function, input terminal I0.x	0	0 (SRM, SLM) 35 (ARM)	82	-	immediately
I1.A	X451.8	I1.B	X452.8	0661	Function, input terminal I1.x	0	0 (SRM, SLM) 7 (ARM)	82	-	immediately

Table 6-44 Overview of the freely-parameterizable input terminals, continued

Terminal				Parameter						
Drive A		Drive B		No.	Name	Min.	Standard	Max.	Unit	Effective
I2.A	X451.9	I2.B	X452.9	0662	Function, input terminal I2.x	0	3	82	-	immediately
I3.A	X451.10	I3.B	X452.10	0663	Function, input terminal I3.x	0	4	82	-	immediately
-	-	-	-		Each input terminal can be assigned a function using these parameters. The function number from the list of input signals is entered (refer to Chapter 6.4.3). Note: The status of the input terminals is displayed in P0678 for diagnostic purposes (refer to Chapter 4.5).					

6.4.3 List of input signals

Reader's note

The drive receives the input signals, listed in the Tables 6-45 and 6-46 either from an input terminal or as control bit from PROFIBUS-DP. All of the input signals can be found under the index entry "Input signal...".

The following must be specified for each signal:

- **Fct. No.:**
The function number is required to parameterize the input terminal via the display and operator control unit.
 - **Operating mode (P0700):**
This specifies in which operating mode the signal is available (x: Available, -: Not available).
n-set: "Speed/torque setpoint" mode
pos: "Positioning" mode
 - **PROFIBUS bit:**
The bit name is required to control the signal via PROFIBUS-DP (refer to Chapter 5.6.1).
Example: STW1.4 --> that means control word 1, bit 4
-

Table 6-45 Overview of the input signals

Signal name, description	Fct. No.	Operating mode		PROFIBUS bit
		n-set	pos	
Inactive	0	x	x	-
Activate function generator immediately (from SW 11.1)	2	x	-	STW1.11
Reset the fault memory	3	x	x	STW1.7
Open-loop torque controlled mode	4	x	-	STW1.14
Motor data set changeover (from SW 2.4)				
1st input/2 ⁰	5	x	-	STW2.9
2nd input/2 ¹	6	x	-	STW2.10
Ramp-up time zero	7	x	x	STW2.4
Integrator inhibit, speed controller	8	x	x	STW2.6
Parameter set changeover				
1st input/2 ⁰	9	x	x	STW2.0
2nd input/2 ¹	10	x	x	STW2.1
3rd input/2 ²	11	x	x	STW2.2
Fixed speed setpoint (from SW 3.1)				
1st input/2 ⁰	15	x	-	-
2nd input/2 ¹	16	x	-	-
3rd input/2 ²	17	x	-	-
4th input/2 ³	18	x	-	-
First speed setpoint filter off	25	x	x	STW2.3
Suppress fault 608 (from SW 3.1)	26	x	x	STW2.8
Spindle positioning on (from SW 5.1)	28	x	-	STW1.15
ON/OFF 1 (from SW 8.3)	31 (from SW 8.3)	x	x	STW1.0
Operating condition/OFF 2	32 (from SW 4.1)	x	x	STW1.1
Operating condition/OFF 3	33 (from SW 5.1)	x	x	STW1.2
Enable inverter/pulse inhibit	34 (from SW 4.1)	x	x	STW1.3
Ramp-up generator enabled	35	x	-	STW1.4
Selection, parking axis	40	x	x	STW2.7
Activate function generator (edge) (from SW 8.1)	41 (from SW 9.1)	x	-	STW1.8
Activate function generator (edge) (from SW 9.1)	41	-	x	PosStw.15
Opening the holding brake for test purposes (from SW 4.1)	42	x	x	STW1.12

Table 6-45 Overview of the input signals, continued

Signal name, description	Fct. No.	Operating mode		PROFIBUS bit
		n-set	pos	
Block selection	50	x	x	SatzAnw.0
1st input/2 ⁰	51	x	x	SatzAnw.1
2nd input/2 ¹	52	x	x	SatzAnw.2
3rd input/2 ²	53	x	x	SatzAnw.3
4th input/2 ³	54	x	x	SatzAnw.4
5th input/2 ⁴	55	x	x	SatzAnw.5
6th input/2 ⁵	56	x	x	SatzAnw.6
(from SW 10.1) 7th input/2 ⁶	57	x	x	SatzAnw.7
(being prep., from SW 10.1) 8th input/2 ⁷				
Operating condition/reject traversing task	58	-	x	STW1.4
Oper. condition/intermediate stop	59	-	x	STW1.5
Activate traversing task (edge)	60	-	x	STW1.6
Incremental jogging (from SW 4.1)	61	-	x	PosStw.5
Jogging 1 ON/jogging 1 OFF	62	-	x	STW1.8
Jogging 2 ON/jogging 2 OFF	63	-	x	STW1.9
Activate teach-in (edge) (from SW 4.1)	64	-	x	PosStw.6
Control requested/no control requested	-	x	x	STW1.10
Start referencing/cancel referencing	65	-	x	STW1.11
External block change (from SW 3.1)	67	-	x	STW1.13
Fixed stop, sensor (from SW 3.3)	68	-	x	PosStw.3
Request passive referencing (from SW 5.1)	69	-	x	STW1.15
Follow-up mode	70	-	x	PosStw.0
Setting the home position	71	-	x	PosStw.1
Activate coupling (from SW 3.3)	72	-	x	PosStw.4
Activate coupling via IO.x (from SW 3.3)	73	-	x	-
Set setpoint, master drive (from SW 4.1)	74	-	x	QStw.0
Invert the angular incremental encoder input (from SW 3.5)	75	-	x	PosStw.7
Reference cams	78	-	x	PosStw.2
Equivalent zero mark	79	x	x	-
Flying measurement/length measurement (from SW 3.1)	80	x	-	-
Plus hardware limit switch (NC contact) (n-set from SW 8.1)	81	x	x	-
Minus hardware limit switch (NC contact) (n-set from SW 8.1)	82	x	x	-
Activate MDI (from SW 7.1)	83	-	x	SatzAnw.15
Activate angular incremental encoder, handwheel (from SW 8.1)	84	-	x	SatzAnw.13
Angular incremental encoder handwheel evaluation, bit 0 (from SW 8.1)	85	-	x	SatzAnw.11
Angular incremental encoder handwheel evaluation, bit 1 (from SW 8.1)	86	-	x	SatzAnw.12

Table 6-45 Overview of the input signals, continued

Signal name, description	Fct. No.	Operating mode		PROFIBUS bit
		n-set	pos	
Ramp-function generator start/ramp-function generator stop	-	x	-	STW1.5
Enable setpoint/inhibit setpoint	-	x	-	STW1.6
Accelerating time zero for controller enable (from SW 3.1)	-	x	-	STW1.13
Motor changed over (from SW 2.4)	-	x	-	STW2.11
Master sign-of-life (from SW 3.1)	-	x	x	STW2.12 STW2.13 STW2.14 STW2.15

Table 6-46 List of input signals

Signal name, description	Fct. No.	Operating mode		PROFIBUS bit
		n-set	pos	
Inactive	0	x	x	-
<p>The input with this function is switched "inactive". The input terminal can still be connected-up, but is not evaluated.</p> <p>Application: During commissioning (start-up), "disturbing" inputs are first disabled, and are then activated later and commissioned.</p>				
Activate function generator immediately (from SW 11.1)	2	x	-	STW1.11
<p>Through this input signal the function generator can be activated immediately in the "Speed/Torque setpoint" operating mode and thus the "Oscillate" function be implemented analog, as at the SIMODRIVE 611 drive.</p> <p>1 signal Function generator is activated immediately 0 signal Function generator is deactivated</p> <p>Note:</p> <ul style="list-style-type: none"> Activating the function generator immediately is described in Chapter 6.19. 				

Table 6-46 List of input signals, continued

Signal name, description	Fct. No.	Operating mode		PROFIBUS bit															
		n-set	pos																
Reset the fault memory	3	x	x	STW1.7															
<p>Faults that are present that are acknowledged with RESET FAULT MEMORY, are reset via this input signal.</p> <p>Before acknowledging faults/errors, their cause must first be removed.</p> <p>Requirements: The controller enable signal at terminal 65.x has been withdrawn.</p> <p>1 signal No effect</p> <p>0/1 signal The fault memory is reset and the fault(s) acknowledged using a 0/1 edge.</p> <p>0 signal No effect</p> <p>Note:</p> <ul style="list-style-type: none"> Faults, which can be acknowledged with POWER ON, cannot be reset in this fashion. The drive remains in the fault condition until all of the faults/errors have been removed. In the PROFIBUS mode the system then goes into the "power-on inhibit" status. From SW 6.1 and for P1012.12 = 1, the fault can also be acknowledged without the prerequisite that the control signal STW1.0 = 0. The drive however, remains in the "power-on inhibit" condition. 																			
Open-loop torque controlled mode	4	x	-	STW1.14															
<p>It is possible to toggle between closed-loop speed controlled and open-loop torque controlled operation via this input signal.</p> <p>1 signal Open-loop torque controlled operation (M_{set} mode)</p> <p>0 signal Closed-loop speed controlled operation (n_{set} mode)</p> <p>Application: Master/slave, refer to Chapter 6.6.5.</p>																			
Motor data set changeover (from SW 2.4)																			
1st input/ 2^0	5	x	-	STW2.9															
2nd input/ 2^1	6	x	-	STW2.10															
<p>It is possible to toggle between a total of 4 motors/motor data sets using these 2 input signals.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Motor data set</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> </tr> </thead> <tbody> <tr> <td>1st input/weighting 2^0</td> <td>0</td> <td>1</td> <td>0</td> <td>1</td> </tr> <tr> <td>2nd input/weighting 2^1</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> </tbody> </table> <p>Note:</p> <ul style="list-style-type: none"> The motor changeover version and therefore the behavior of the terminal, is selected using P1013 (motor changeover). Output terminal signals with function numbers 11, 12, 13 and 14 (motors 1, 2, 3 or 4 selected) are used to control the contactors to change over the motor. In order to ensure that the function changes over in a controlled fashion (identified as being simultaneous) the switching operation of the inputs must be completed with one interpolation clock cycle (P1010). Motor changeover is described in Chapter 6.11. 					Motor data set	1	2	3	4	1st input/weighting 2^0	0	1	0	1	2nd input/weighting 2^1	0	0	1	1
Motor data set	1	2	3	4															
1st input/weighting 2^0	0	1	0	1															
2nd input/weighting 2^1	0	0	1	1															
Ramp-up time zero	7	x	x	STW2.4															
<p>The ramp-function generator (RFG) can be switched-in and out via this input signal.</p> <p>1 signal Ramp-function generator off This acts just like a ramp-up and ramp-down of the ramp-function generator of 0 ms.</p> <p>0 signal Ramp-function generator on</p>																			