

ADC wire-breakage detection

MICROMASTER 4 and SINAMICS G120

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1 Wire-breakage detection of the analog channel

For plants and building technology (e.g. fan / pump applications) and the chemical industry (e.g. mixers), a high degree of availability is demanded even if the setpoint is interrupted due to an external event. If the setpoint is entered using an analog input, then a wire breakage detection for the analog channel should be provided that also uses the actual frequency as setpoint.

The wire-breakage monitoring is integrated in the analog input channel (refer to Fig. 1-1) and is selected using parameters P0756 and P0761.

In this case, when the analog input signal falls below the wire breakage threshold ($0.5 * P0761$), fault F0080 is initiated after time P0762 expires and the status bit is set in parameter P0751 (refer to Fig. 1-2).

The following secondary conditions apply for the wire-breakage detection:

- Width of the ADC deadzone $P0761 > 0$
- Wire-breakage detection if the ADC input quantity $\leq 0.5 * P0761$
- The detection function must be activated using parameter P0756

In addition to parameter P0756, the DIP switches of the analog inputs on the I/O module should be observed. Location details of DIP-switch, please find in the respective operating instruction

NOTE

Wire-breakage detection is only possible for a unipolar analog input

Input range 0 to $0.5 * P0761$ of the analog input must be excluded when activating the wire-breakage detection for normal operation.

BiCo parameter not available for every inverter.

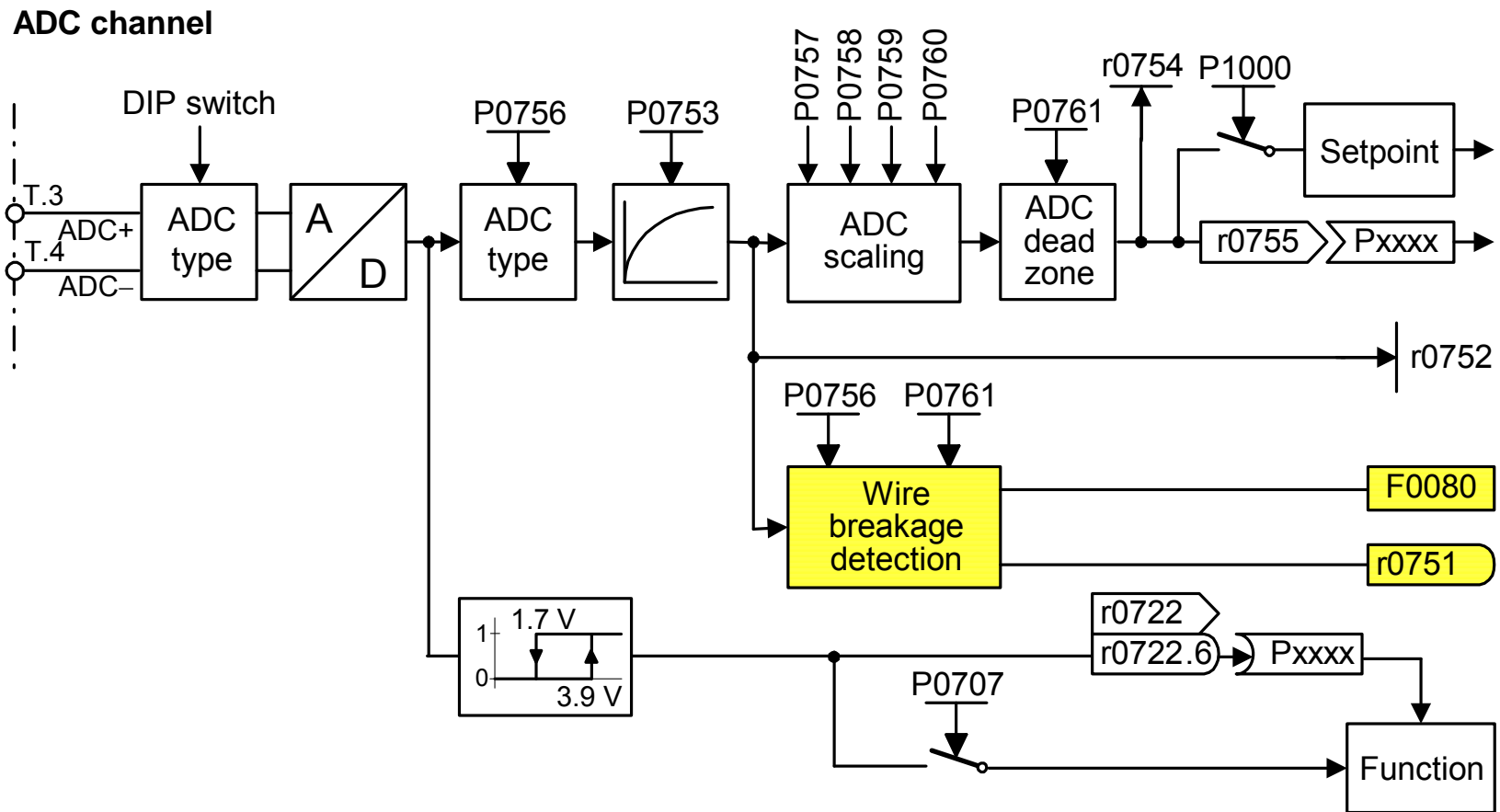


Figure 1-1 ADC channel with wire breakage detection

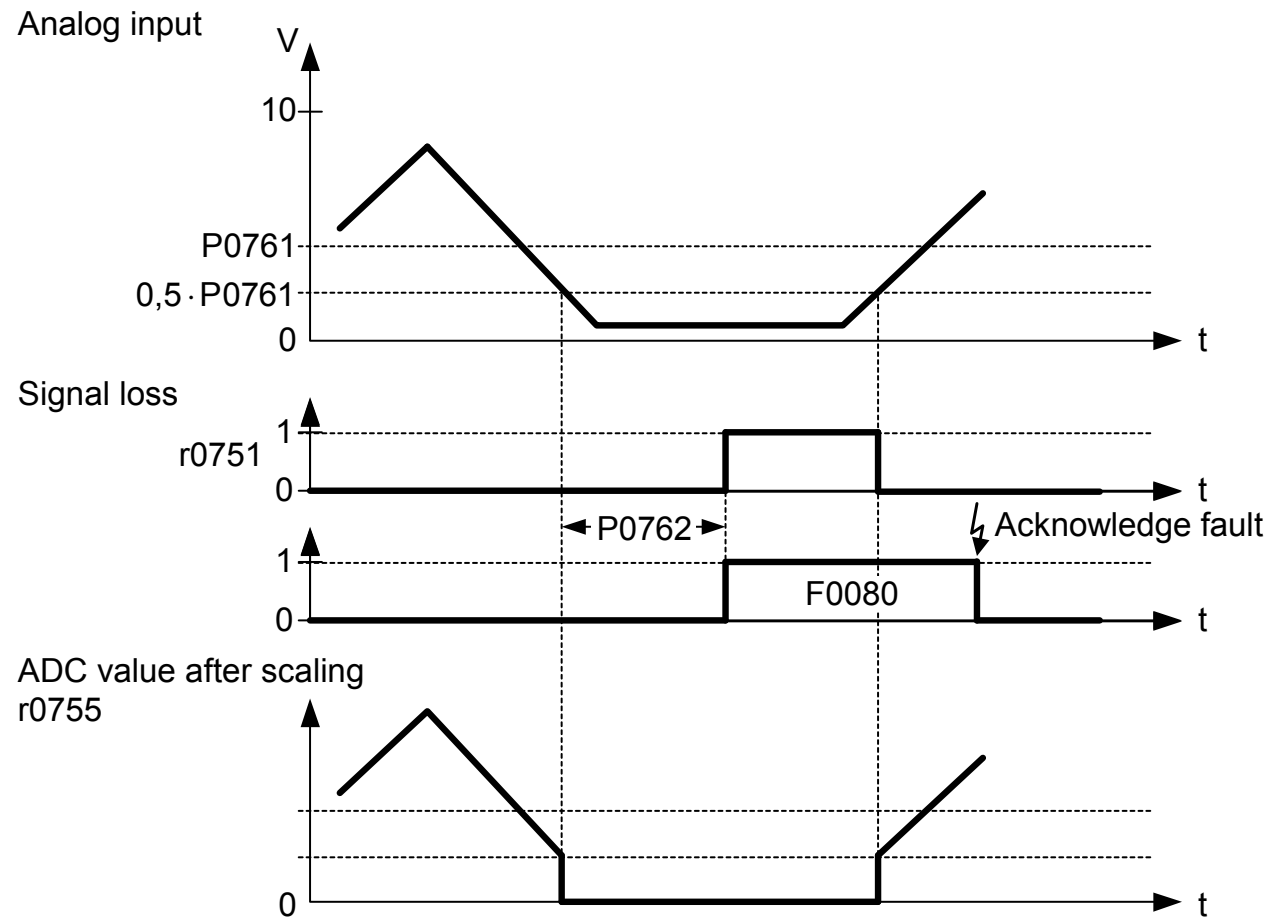


Figure 1-2 Wire-breakage detection

2 Modified response to the wire-breakage detection

In addition to the above standard response (fault F0080 with OFF2), an application-specific response can be implemented using parameter r0751 and BICO technology. In this case, the standard response using parameter P2100 and P2101 should be suppressed.

In this particular case, when a wire breakage is detected, the drive should continue to operate with the actual frequency. This guarantees a high plant/system availability. The drive is then operated at a constant frequency from when the wire breakage actually occurred up until repairs have been completed (refer to Function diagram). After the wire breakage has been resolved, the frequency inverter accepts the actual analog input value as setpoint and accelerates or brakes the motor corresponding to this value (refer to Fig. 2-1).

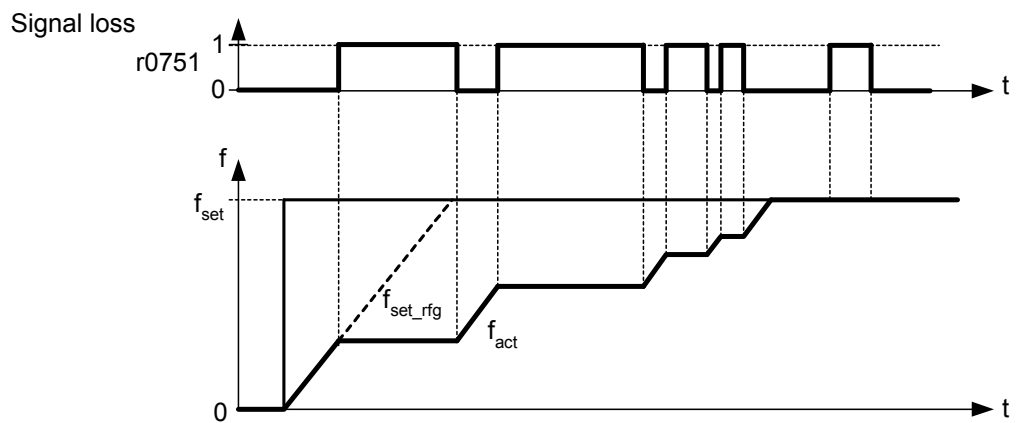


Figure 2-1 Acceleration with a modified wire-breakage detection function

3 Parameter settings

Parameter for Command / setpoint source

Par.No.	ParDescription	ParValue	ParValueDescription
P0700	Selects the command source	2	Terminal strip
P1000	Selects the setpoint source	2	Analog input
P0701	Function, digital input 1	1	ON /OFF

Parameter for Analog input

Par.No.	ParDescription	ParValue	ParValueDescription
P0756	ADC type	1	Unipolar voltage input with monitoring (0 ... 10 V) ¹
P0757	ADC scaling x1	0.00	---
P0758	ADC scaling y1	0.00	---
P0759	ADC scaling x2	10.00	---
P0760	ADC scaling y2	100.00	---
P0761	ADC deadzone	0.10	---
P0762	ADC signal loss delay	0	---

Fault suppression

Par.No.	ParDescription	ParValue	ParValueDescription
P2100[0]	Selects the alarm number	80	F0080 is suppressed
P2101[0]	Stop response value	0	No response, no display

Free Function Blocks FFB

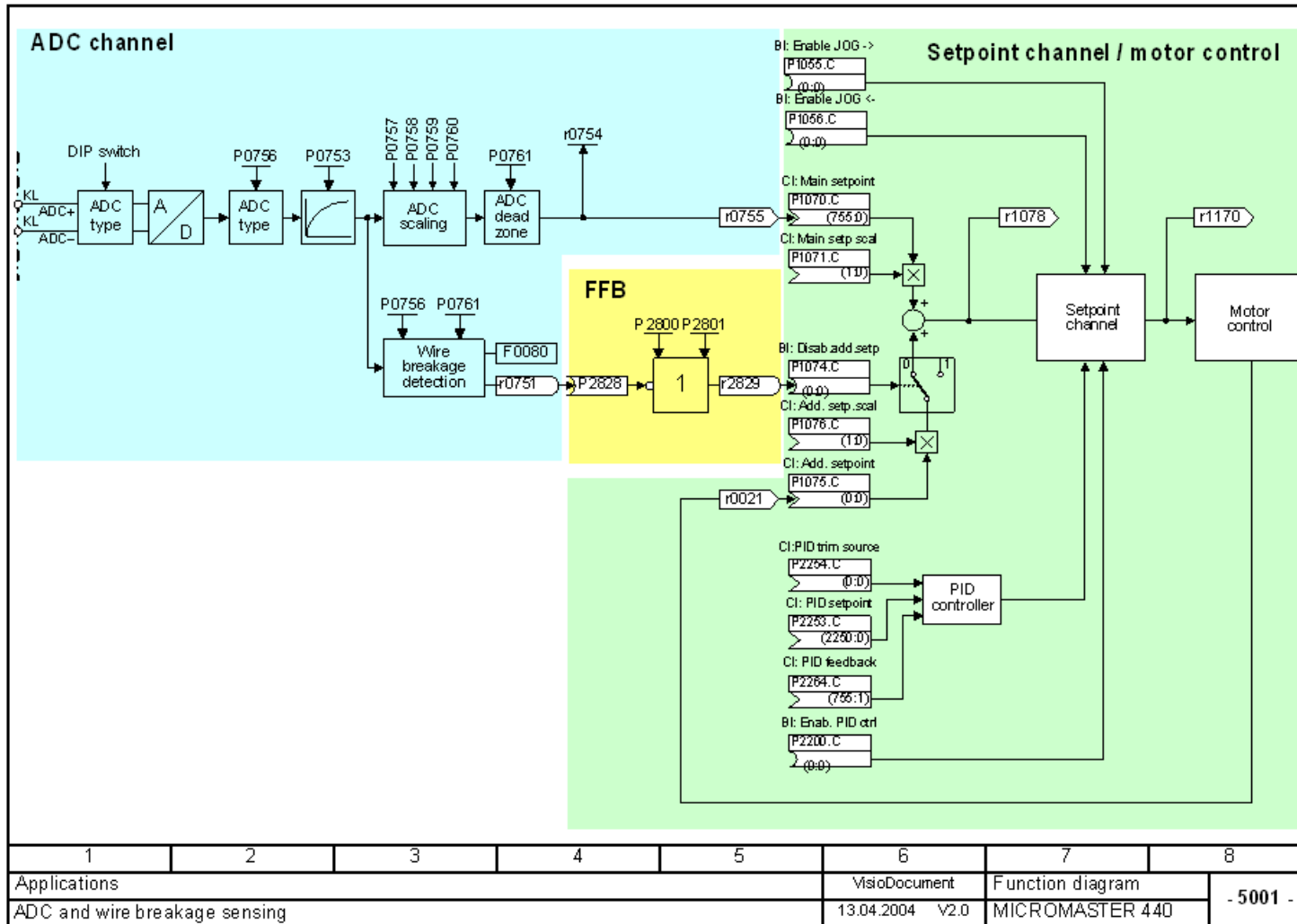
Par.No.	ParDescription	ParValue	ParValueDescription
P2800	Enables FFB	1	Enable
P2801[9]	Activates FFB	1	Enables NOT1, level 1
P2828	BI: NOT1	751:0	Wire breakage ADC1

BiCo

Par.No.	ParDescription	ParValue	ParValueDescription
P1074	BI: Supplementary setpoint inhibit	2829:0	BO: NOT1 (output NOT1)
P1075	CI: Selects a supplementary setpoint	21:0	CO: Actual frequency

¹ 0 ... 20mA - P0756 = 3 - see parameterlist

4 Function diagram – modified response to wire-breakage detection



5 History

Table 5-1

Version	Date	Modifications
V1.0	October 2000	First version (tips & tricks; 017)
V1.1	April 2010	revised text