

2019-11-28 **Specifications can be changed without prior notice**
To be moved to bottom of each page with correct date.

- Overspeed, limit- and positioning unit
- Absolute EnDat 2.2 encoder interface
- PROFINET interface for feedback values, configuration and diagnostics
- 3 programmable speed switches



General description

The SAFEWAY unit is a generic overspeed limit device. It is used to monitor the speed of a rotating axis, and upon detection of a breach of user configured limits, break up a circuit to stop a motor or to assert brakes.

The unit consists of three Overspeed alarm outputs and one general Error alarm output. For use as a part of an automated function the Error Alarm Output and Overspeed Output 2 should be connected in series as depicted in the figure below. These two alarm outputs cannot be bypassed by configuration and they have different polarity to decrease the risk of common cause failures.

The configuration of the speed limit settings is done via the PROFINET interface. This interface also provides feedback values (position, speed, acceleration, standstill information...) and diagnostic information for the automation control equipment. The SAFEWAY unit enters Off-line mode when the PROFINET connection is lost during operation or missing at startup.

The SAFEWAY unit reads the position from a Multi-turn EnDat 2.2 encoder placed on a rotating shaft and calculates the speed and acceleration based on the user provided scaling parameters.

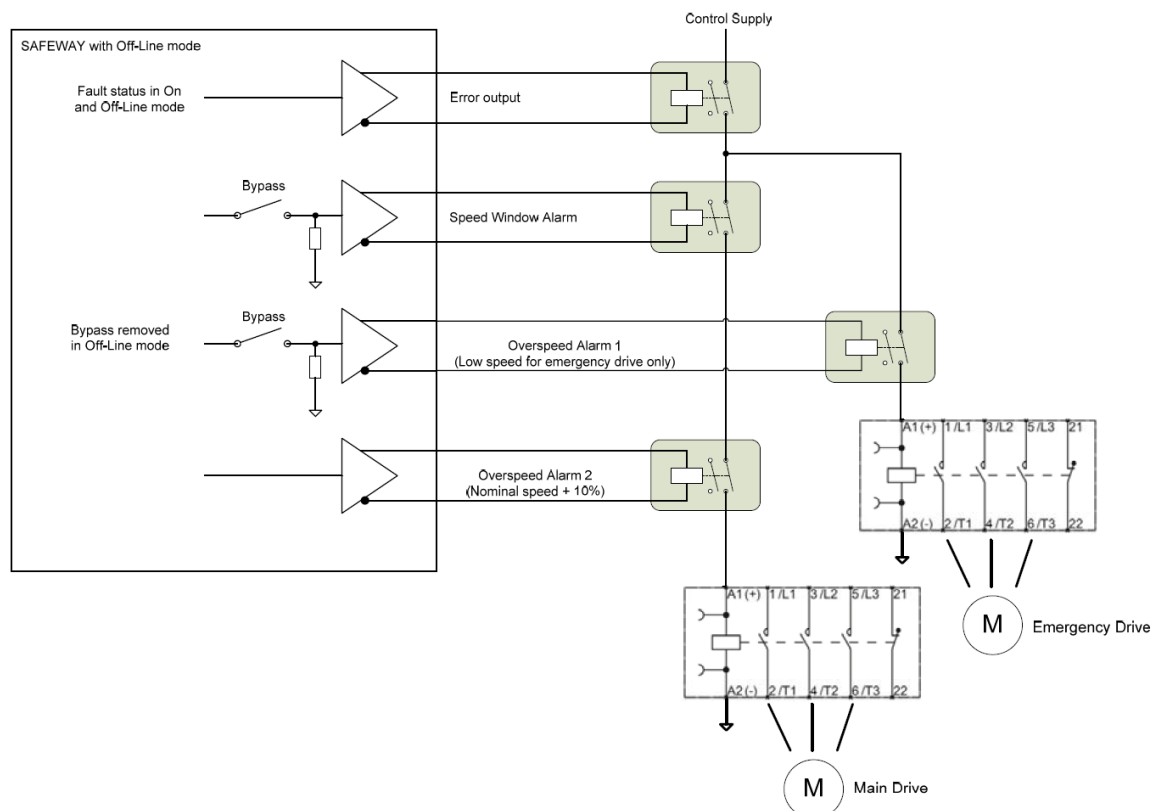


Figure: SAFEWAY unit and interfacing device

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General electrical specification

Supply voltage SAFEWAY	9-30 Vdc
Power consumption	5W

EnDat Input Interface

Supply voltage to encoder	5 Vdc (Powered by SAFEWAY)
Signal type from encoder	EnDat 2.2
Cable length between encoder and gateway	50m (Max)

PROFINET Interface

Cable length	100m
Isolation of PROFIBUS interface	1500 Vdc

For comprehensive explanation of the PROFINET parameters and diagnostics advise the SAFEWAY application profile.

Error output

Permissible load	20mA (Max)
Cable length (Max)	200m
Alarm types	System errors

Overspeed limits, outputs 1-3

Permissible load	20mA (Max)
Cable length (Max)	200m
Alarm types	Speed window, overspeed 1 and overspeed 2

Mechanical specification

Housing	Aluminum
Mounting	DIN rail 15mm or chassis
Temperature Operating	- 40°C ... +70°C
Temperature Storage	- 40°C ... +70°C
Protection class	IP 67
Vibration	< 100 m/s ² (55...2000 Hz)
Shock	< 1000 m/s ² (6 ms)

LED indication

Bus	Module	Meaning	Cause
Off	Off	No power	
Red	Green	No connection to another device. Criteria: No data exchange	<ul style="list-style-type: none"> - Bus disconnected - Controller not available/ switched off
Blinking red	Green	Parameterization fault, no data exchange Criteria: Data exchange correct, however the encoder did not switch to the data exchange mode	<ul style="list-style-type: none"> - I/O device not configured yet or wrong configuration - Wrong station address assigned - Actual configuration of the slave differs from the nominal configuration
Green	Red	System failure	<ul style="list-style-type: none"> - Diagnosis exists, slave in data exchange mode
Green	Green	Data exchange and encoder functions properly	
Blinking* green	Blinking green	Firmware upgrade in process	
Blinking* red	Blinking red	Failure during firmware upgrade	
Red	Red	Missing EnDat encoder; No bus communication	<ul style="list-style-type: none"> - Connect EnDat encoder to gateway
Green	Orange	Warning present	<ul style="list-style-type: none"> - Command not supported

*) The blinking frequency is 0.5 Hz. Minimal indication time is 3 seconds.

Behavior of signals and outputs on fault conditions

Module status	Bus status	Encoder status	Signal and output states
OK	OK	OK	Normal operation
Not OK (RED)	OK	OK	Error output active
			Speed alarms frozen
			Position value valid
			Velocity value valid
Not OK (RED)	Not OK (RED or flashing RED)	OK	Error output active
			Speed alarms frozen
			No PROFINET Data_exchange
Not OK (RED)	OK	Not OK (RED)	Error output active
			Speed alarms frozen
			Position value frozen
			Velocity value = 0
Off-line mode active	Not OK	OK	Off-line mode operation
(flashing RED)	(RED or flashing RED)		No PROFINET Data_exchange

Pin configuration

Terminal on device	Function	Connector pin	Wire color
OUTPUTS			
M12 8 pin Male	Error Output Inverted	1	White
	Error Output	2	Brown
	Speed Window Alarm	3	Green
	Speed Window Alarm Inverted	4	Yellow
	Overspeed 1	5	Grey
	Overspeed 1 Inverted	6	Pink
	Overspeed 2	7	Blue
	Overspeed 2 Inverted	8	Red
INPUT			
M12 8 pin Female	Sense 0V	1	White
	Sense +V	2	Brown
	Data	3	Green
	Data Inverted	4	Yellow
	Supply 0V (Un)	5	Grey
	Clock Inverted	6	Pink
	Clock	7	Blue
	Supply +V (Up)	8	Red
POWER			
4 pin M12 A-coded Male	+EV	1	Brown
	0V	3	Blue
PORT 1			
5 pin M12 D-coded Male	Tx+	1	Yellow
	Rx+	2	White
	Tx-	3	Orange
	Rx-	4	Blue
PORT 2			
5 pin M12 D-coded Female	Tx+	1	Yellow
	Rx+	2	White
	Tx-	3	Orange
	Rx-	4	Blue

Mechanical drawing

