



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



General description

The SAFEWAY unit is a generic overspeed and position limit device. It is used to monitor the position and 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 eight Position limit alarm outputs, 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 unit with speed and position limit settings is done via the PROFIBUS interface. This interface also provides feedback values (speed, position, standstill information...) and diagnostic information for the automation control equipment. The SAFEWAY unit is available in two variants, -01 and -02, with a difference in the behavior when loosing the PROFIBUS connection. Variant -01 activates the Error alarm output when the PROFIBUS connection is lost. Variant -02 continue to operate in an Off-line mode when the PROFIBUS connection is lost during operation or missing at startup.

The SAFEWAY unit reads the position from a Multiturn EnDat encoder placed on a rotating shaft and calculates the speed based on the user provided scaling parameters.

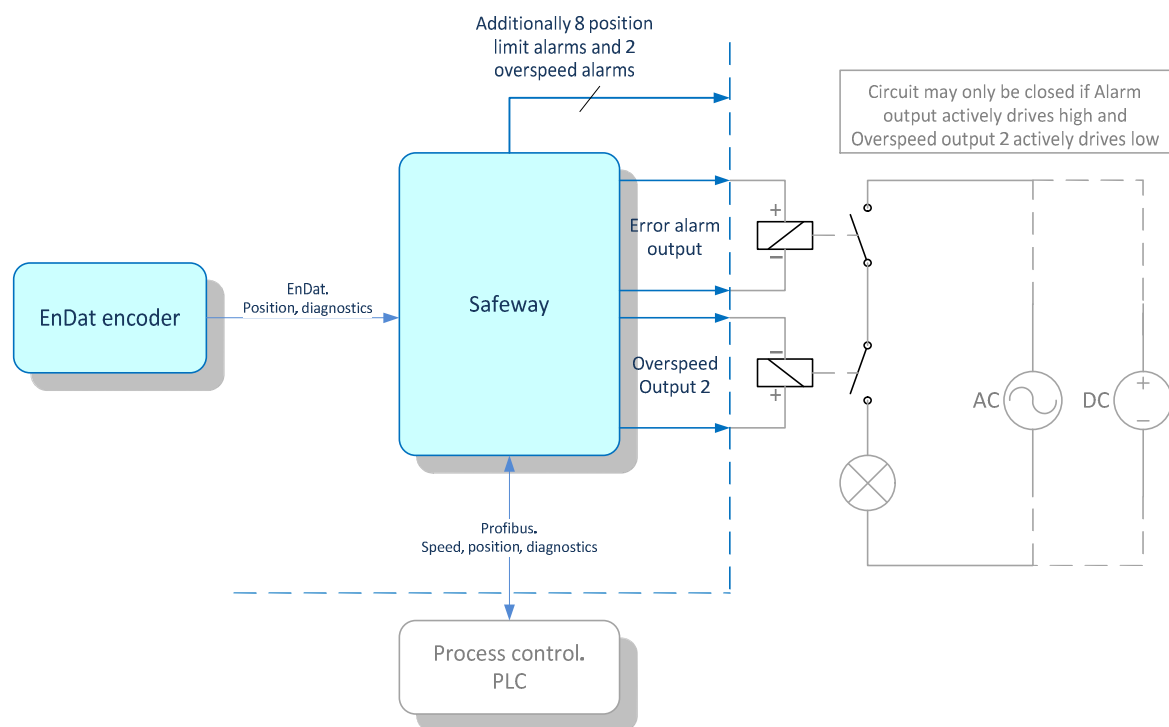


Figure: SAFEWAY unit and interfacing device

2015-02-13 Specifications can be changed without prior notice

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)

Position limits, outputs 1-8

Permissible load	20mA (Max)
Signal levels	HTL implemented via Line drivers
Cable length (Max)	200m

PROFIBUS Interface

Baudrate	9.6kb/s – 12Mb/s
Cable length	400m @ 1,5Mb/s, 100m at 12Mb/s
Isolation of PROFIBUS interface	1kVdc
Address setting configurable via switches	3 DIP-switches (Address 0-126)

For comprehensive explanation of the PROFIBUS 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

Module (SAFEWAY status)	GREEN = OK
	Flashing GREEN = Commissioning in operation
	Flashing RED = Off-line mode active
	RED = Not OK, Error output active
Bus (PROFIBUS status)	GREEN = OK
	Flashing RED = Waiting for Bus and configuration or Parameter failure during configuration
	RED = Not OK, Bus failure after configuration
Encoder (Encoder status)	GREEN = OK
	Flashing GREEN = Position warning (Preset needed) or indication of invalid encoder configuration (related to PROFIBUS configuration failure)
	RED = Not OK
Overspeed (Overspeed outputs triggered)	GREEN = Speed < Speed limit
	RED = Speed > Speed limit (one or several limits reached)

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
			Position and speed alarms frozen
			Position value valid
Not OK (RED)	Not OK (RED or flashing RED)	OK	Velocity value valid
			Error output active (Note 1)
			Position and speed alarms frozen
Not OK (RED)	OK	Not OK (RED)	No PROFIBUS Data_exchange
			Error output active
			Position and speed alarms frozen
			Position value frozen
Off-line mode active (flashing RED)	Not OK (RED or flashing RED)	OK	Velocity value = 0
			Off-line mode operation (Note 2)
			No PROFIBUS Data_exchange

Note 1: Combination valid only for SAFEWAY variant -01 (part number 895479-01)

Note 2: Combination valid only for SAFEWAY variant -02 (part number 895479-02)

Pin configuration

Terminal on device	Function	Connector pin	Wire color
X1 Position limit outputs, 1-4			
M12 8 pin Male	Position limit 1	1	White
	Position limit 1 inv	2	Brown
	Position limit 2	3	Green
	Position limit 2 inv	4	Yellow
	Position limit 3	5	Grey
	Position limit 3 inv	6	Pink
	Position limit 4	7	Blue
	Position limit 4 inv	8	Red
X2 Position limit outputs, 5-8			
M12 8 pin Male	Position limit 5	1	White
	Position limit 5 inv	2	Brown
	Position limit 6	3	Green
	Position limit 6 inv	4	Yellow
	Position limit 7	5	Grey
	Position limit 7 inv	6	Pink
	Position limit 8	7	Blue
	Position limit 8 inv	8	Red
X3 Overspeed and Error outputs			
M12 8 pin Male	Error output inv	1	White
	Error output	2	Brown
	Speed Window Alarm	3	Green
	Speed Window Alarm inv	4	Yellow
	Overspeed 1	5	Grey
	Overspeed 1 inv	6	Pink
	Overspeed 2	7	Blue
	Overspeed 2 inv	8	Red
X4 EnDat encoder input			
M12 8 pin Female	Supply 0V (Un)	5	Grey
	Sense 0V	1	White
	Supply +V (Up)	8	Red
	Sense +V	2	Brown
	Data	3	Green
	Data inv	4	Yellow
	Clock	7	Blue
	Clock inv	6	Pink

Pin configuration continue

Terminal on device	Function	Connector pin	Wire color
X5 Power supply			
4 pin M12 A-coded Male	+EV	1	Brown
	0V	3	Blue
X6 PROFIBUS IN connector			
5 pin M12 B-coded Male	A	2	White
	B	4	Black
	Chassi/Shield	5	Yellow/Green
X7 PROFIBUS out connector			
5 pin M12 B-coded Female	VP	1	Brown
	A	2	White
	DGND	3	Blue
	B	4	Black
	Chassi/Shield	5	Yellow/Green

Ordering information

Part number	Description
895479-01	ERG SAFEWAY variant -01
895479-02	ERG SAFEWAY variant -02 (Off-line mode support)
1078963-01	PROFIBUS GSD file for ERG SAFEWAY, LL040D6F.GSD

Accessories

Encoders

Part number	Description
1078297-01	EnDat 2.2 hollow shaft encoder, IHA 698 59 Ø12 tns, 3.6-14V, 8pM12
1082905-01	EnDat 2.2 solid shaft encoder, ISA 608 63 Ø12 with keyway, 3.6-14V, 8pM12

Cables

Part number	Description	Port	Cable length
586238-03	Position limits outputs 1-4, cable	X1	2m
586238-03	Position limits outputs 5-8, cable	X2	2m
586238-03	Overspeed and error output cable	X3	2m
368330-15	Encoder input cable	X4	15m
586238-05	Power supply cable	X5	2m
1078208-01	PROFIBUS IN connector cable	X6	2m
584217-01	PROFIBUS OUT Terminating resistor	X7	-
1078209-01	PROFIBUS interconnect cable	X6/X7	1m

Mechanical drawing

