

Rotary encoders / angle sensors

Selection Guide

Industrial encoders incremental

Size up to ø58 mm

Size (ø)	Precise optical	Solid shaft	Blind hollow shaft	Through hollow shaft	TTL/RS422	HTL/push-pull	Pulses per revolution	≤ 5000	> 5000	Programmable	Product family	Page
24 mm	■	■			■	■					ITD 01 B14	6
24 mm	■		■		■	■					ITD 01 A 4 Y1	6
58 mm	■	■			■	■					EIL580-SC	7
58 mm	■	■			■	■					EIL580P-SC	7
58 mm	■	■			■	■					EIL580-SY	7
58 mm	■	■			■	■					EIL580P-SY	7
58 mm	■		■		■	■					EIL580-B	7
58 mm	■		■		■	■					EIL580P-B	7
58 mm	■			■	■	■					EIL580-T	7
58 mm	■			■	■	■					EIL580P-T	7



ITD 01 B14



ITD 01 A4 Y1



EIL580-SC
EIL580P-SC



EIL580-SY
EIL580P-SY



EIL580-B
EIL580P-B



EIL580-T
EIL580P-T

Large hollow shaft

Hollow shaft (ø max.)	Through hollow shaft	TTL/RS422	HTL/push-pull	Pulses per revolution	≤ 5000	> 5000	Programmable	Product family	Page
27 mm	■	■	■		■			ITD 40 A 4	8
30 mm	■	■	■					ITD 40 A 4 Y79	8
25,4 mm	■	■	■		■	■		HS35F	8
25,4 mm	■	■	■		■	■	■	HS35P	8
50 mm	■	■	■		■			ITD 70 A 4 Y 7	9
65 mm	■	■	■		■			ITD 70 A 4 Y 9	9
85 mm	■	■	■		■			ITD 75 A 4	9



ITD 40 A 4



ITD 40 A 4 Y79



HS35F
HS35P



ITD 70 A 4 Y 7



ITD 70 A 4 Y 9



ITD 75 A 4

Sine/Cosine

Size (ø)	Through hollow shaft	Sine periods per revolution	≤ 2048	> 2048	SIL	Product family	Page
58 mm	■		■			EIL576S-T	10
80 mm	■		■			HS35S	10
80 mm	■			■		ITD 42 A4	10



EIL576S-T



HS35S



ITD 42 A4

Industrial encoders absolute

Size up to ø36 mm

Size (ø)	Solid shaft	Blind hollow shaft	Singleturn	Multiturn	SSI	Analog	CANopen*	CANopen* redundant	SAE J1939	Corrosion protection CX (C5-M)	Product family	Page
28 mm	■		■			■	■	■			EAM280	14
30 mm	■	■	■	■	■	■					EAM300	14
36 mm	■		■	■	■	■		■			EAM360-SW	14
36 mm	■		■	■		■	■		■	■	EAM360R-SW	14
36 mm		■	■	■	■	■		■			EAM360-B	15
36 mm		■	■	■		■	■		■	■	EAM360R-B	15



EAM280



EAM300



EAM360-SW



EAM360R-SW



EAM360-B



EAM360R-B

Size ø58 mm - robust magnetic sensing

Size (ø)	Solid shaft	Blind hollow shaft	Singleturn	Multiturn	Integrated interface	Modular bus cover	SSI	Analog	CANopen®	CANopen* redundant	Profinet	SAE J1939	EtherCAT / EtherNet/IP	Profinet	Corrosion protection CX (C5-M)	Product family	Page
58 mm	■		■	■	■		■		■	■		■	■			EAM580-S	16
58 mm	■		■	■	■			■	■	■		■			■	EAM580R-S	16
58 mm		■	■	■	■		■		■	■		■	■			EAM580-B	16
58 mm		■	■	■	■			■	■	■		■			■	EAM580R-B	16



EAM580-S



EAM580R-S



EAM580-B



EAM580R-B

Industrial encoders absolute

Size ø58 mm - precise optical sensing

Size (ø)	Solid shaft	Blind hollow shaft	Through hollow shaft	Multiturn	Singleturn	Resolution up to 18 bits/rev.	SSI / SSI + incremental	CANopen	EtherCAT	EtherNet/IP	Profinet	Product family	Page
58 mm	■			■		■			■	■	■	EAL580-SC	18
58 mm	■			■		■			■	■	■	EAL580-SV	18
58 mm		■		■		■			■	■	■	EAL580-B	18
58 mm			■	■		■			■	■	■	EAL580-T	18
58 mm	■			■			■					GM400	19
58 mm	■			■			■					GM401	19
58 mm	■				■		■					GA240	19
58 mm	■				■		■					GA241	19
58 mm		■		■			■					GXM2S	19
58 mm			■	■			■					G0M2H	19



EAL580-SC



EAL580-SV



EAL580-B



EAL580-T



GM400
GA240



GM401
GA241



GXM2S



G0M2H

HeavyDuty encoders incremental

Size up to ø120 mm / solid shaft

Size (ø)	Shaft (ø max.)	TTL/RS422	HTL/push-pull	HTL-P/Power Linedriver	LWL (Outdoor-Box)	EURO flange B10	Terminal box	Redundant sensing	EMS	Ex II 3G/3D (ATEX)	Ex II 2G (ATEX/IECEX)	Product family	Page
115 mm	11 mm	■	■	■	■	■	■	■	■	■	■	POG 86E	22
115 mm	11 mm	■	■	■	■	■	■	■	■	■	■	POG 86	22
115 mm	11 mm	■	■	■	■	■	■	■	■	■	■	OG 9	22
115 mm	11 mm	■	■	■	■	■	■	■	■	■	■	POG 9	22
115 mm	11 mm	■	■	■	■	■	■	■	■	■	■	POG 90	23
115 mm	11 mm	■	■	■	■	■	■	■	■	■	■	POG 10	23
115 mm	11 mm	■	■	■	■	■	■	■	■	■	■	POG 11	23
120 mm	11 mm	■	■	■	■	■	■	■	■	■	■	EEx OG 9	23



POG 86E



POG 86



OG 9



POG 9



POG 90



POG 10



POG 11



EEx OG 9

Large hollow shaft

Size (ø)	Hollow shaft (ø max.)	TTL/RS422	HTL/push-pull	HTL-P/Power Linedriver	LWL (Outdoor-Box)	Terminal box	Redundant sensing	Ex II 3G/3D (ATEX)	Product family	Page
158 mm	38 mm	■	■	■	■	■	■	■	HOG 16	26
158 mm	75 mm	■	■	■	■	■	■	■	HOG 163	26



HOG 16



HOG 163

Size up to ø105 mm / hollow shaft

Size (ø)	Hollow shaft (ø max.)	TTL/RS422	HTL/push-pull	HTL-P/Power Linedriver	LWL (Outdoor-Box)	Terminal box	Redundant sensing	EMS	Ex II 3G/3D (ATEX)	Product family	Page
99 mm	16 mm	■	■	■	■	■	■	■	■	HOG 86E	24
99 mm	16 mm	■	■	■	■	■	■	■	■	HOG 86	24
97 mm	16 mm	■	■	■	■	■	■	■	■	HOG 9	24
105 mm	20 mm	■	■	■	■	■	■	■	■	HOG 10	25
105 mm	20 mm	■	■	■	■	■	■	■	■	HOG 11	25
105 mm	20 mm	■	■	■	■	■	■	■	■	HOG 100	25



HOG 86E



HOG 86



HOG 9



HOG 10
HOG 100



HOG 11

Sine/Cosine

Size (ø)	Shaft (ø max.)	Solid shaft	Hollow shaft	EURO flange B10	Terminal box	Ex II 3G/3D (ATEX)	Product family	Page
115 mm	11 mm	■	■	■	■	■	POGS 90	28
105 mm	20 mm	■	■	■	■	■	HOGS 100	28



POGS 90



HOGS 100

HeavyDuty encoders absolute

Size up to ø115 mm

Size (ø)	SSI	CANopen*	DeviceNet	Profibus-DP	EtherCAT	EtherNet/IP	Profinet	EURO-Flange B10	Terminal box	Ex II 3G/3D (ATEX)	Programmable	Speed switches	Product family	Page
115 mm	■	■	■	■	■	■	■	■	■	■	■	■	PMG 10	30
115 mm	■	■	■	■	■	■	■	■	■	■	■	■	PMG 10P	30
105 mm	■	■	■	■	■	■	■	■	■	■	■	■	HMG 10	30
105 mm	■	■	■	■	■	■	■	■	■	■	■	■	HMG 10P	30



PMG 10
PMG 10P



HMG 10
HMG 10P

Size up to ø160 mm

Size (ø)	SSI	CANopen*	DeviceNet	Profibus-DP	Terminal box	Ex II 3G/3D (ATEX)	Product family	Page
160 mm	■	■	■	■	■	■	HMG 161	31



HMG 161

HeavyDuty speed monitoring switches

Mechanical / electronic

Size (ø)	Mechanical	Electronic	Solid shaft	Switching outputs	EURO-Flange B10	Terminal box	Product family	Page
115 mm	■	■	1	■	■	■	FS 90	32
115 mm	■	■	1	■	■	■	ES 90	32
115 mm	■	■	3	■	■	■	ES 93	32



FS 90



ES 90
ES 93

Digital / Stand-alone

Size	Digital/programmable	Switching outputs	Top mount housing	Product family	Page
100 mm	■	4	■	GMM2xxS	70



GMM2xxS

Digital / encoder-integrated / incremental & absolute

Size (ø)	Digital/progr.	Solid shaft	Hollow shaft	TTL/RS422	HTL/push-pull	Switching outputs	EURO-Flange B10	Terminal box	M23	Ex II 3G/3D (ATEX)	Transistor output	Optical	Magnetic	Product family	Page
105 mm	■	■	■	■	2	■	■	■	■	■	■	■	■	HOG 10 + DSL.E	36
165 mm	■	■	■	■	2	■	■	■	■	■	■	■	■	HOG 165 + DSL.E	36
120 mm	■	■	■	■	2	■	■	■	■	■	■	■	■	POG 10 + DSL.E	37
115 mm	■	■	■	■	■	■	■	■	■	■	■	■	■	PMG 10D UO	38
105 mm	■	■	■	■	■	■	■	■	■	■	■	■	■	HMG 10D UO	38
115 mm	■	■	■	■	■	■	■	■	■	■	■	■	■	PMG 10PD	38
105 mm	■	■	■	■	■	■	■	■	■	■	■	■	■	HMG 10PD	38



HOG 10 + DSL.E



HOG 165 + DSL.E



POG 10 + DSL.E



PMG 10D UO
PMG 10DP



HMG 10D UO
HMG 10DP

Rotary encoders / angle sensors

Selection Guide

HeavyDuty tacho generators

Size (ø max.)	Solid shaft	EURO-flange B10	Terminal box	LongLife embedded	Product family	Page
115 mm	■	■	■	■	GTF 7.08	40
115 mm	■	■	■	■	GTF 7.16	40
85 mm	■	■	■	■	TDP 0,09	40
85 mm	■	■	■	■	TDPZ 0,09	40
115 mm	■	■	■	■	TDP 0,2	40
115 mm	■	■	■	■	TDPZ 0,2	40
175 mm	■	■	■	■	TDP 13	40
175 mm	■	■	■	■	TDPZ 13	40



Size (ø max.)	Hollow shaft	Bearingless variant	LongLife embedded	Product family	Page
52 mm	■	■	■	GT 5	42
85 mm	■	■	■	GT 7.08	40
85 mm	■	■	■	GT 7.16	40
89 mm	■	■	■	GT 9	42
95 mm	■	■	■	GTB 9.06	42
95 mm	■	■	■	GTB 9.16	42
95 mm	■	■	■	GTR 9	43
86 mm	■	■	■	KTD 4	43



HeavyDuty combinations

Incremental twin encoder

Size (ø)	Solid shaft	Hollow shaft	TTL/RS422	HTL/push-pull	EURO flange B10	Terminal box	Redundant sensing	Ex II 3G/3D (ATEX)	Corrosion protection CX (C5-M)	Product family	Page
115 mm	■	■	■	■	■	■	■	■	■	POG 9 G	22
115 mm	■	■	■	■	■	■	■	■	■	POG 10 G	44
115 mm	■	■	■	■	■	■	■	■	■	POG 11 G	44
97 mm	■	■	■	■	■	■	■	■	■	HOG 9 G	44
105 mm	■	■	■	■	■	■	■	■	■	HOG 10 G	44
105 mm	■	■	■	■	■	■	■	■	■	HOG 11 G	44



HeavyDuty combinations

Tacho generator

Size (ø)	Centrifugal switch (FSL)	Speed switch (ESL)	Incremental encoder	Solid shaft	EURO-Flange B10	Terminal box	Product family	Page
85 mm	■		■	■	■		TDP 0,09 + FSL	45
115 mm	■		■	■	■		TDP 0,2 + FSL	45
115 mm	■		■	■	■		TDPZ 0,2 + FSL	45
115 mm		■	■	■	■		TDP 0,2 + ESL	45
115 mm		■	■	■	■		TDPZ 0,2 + ESL	45
115 mm			■	■	■	■	TDP 0,2 + OG9	45



Incremental encoders with speed switch

Size (ø)	Incremental	Mechanical (FSL)	Electronic (ESL)	Solid shaft	Blind hollow shaft	TTL/RS422	HTL/push-pull	Product family	Page
115 mm	■	■	■	■	■	■	■	POG 9 + FSL	46
115 mm	■		■	■	■	■	■	POG 9 + ESL	46
115 mm	■	■		■	■	■	■	POG 10 + FSL	46
115 mm	■		■	■	■	■	■	POG 10 + ESL	46
115 mm	■	■		■	■	■	■	POG 11 + FSL	46
115 mm	■		■	■	■	■	■	POG 11 + ESL	46
105 mm	■	■		■	■	■	■	HOG 10 + FSL	47
105 mm	■		■	■	■	■	■	HOG 10 + ESL	47
105 mm	■	■		■	■	■	■	HOG 11 + FSL	47
105 mm	■		■	■	■	■	■	HOG 11 + ESL	47



Bearingless encoders

Incremental

Hollow shaft (ø max.)	TTL/RS422	HTL/push-pull	SinCos 1 Vpp	DNV certification	Product family	Page
47,8 mm	■				EB200E	50
47,8 mm	■	■			MIR 10	50
28 mm	■	■			ITD49H	50
28 mm			■		ITD49H Sine	50
65 mm	■	■			ITD69H	51
65 mm			■		ITD69H Sine	51
140 mm	■	■			ITD89H	51
140 mm			■		ITD89H Sine	51
80 mm	■	■	■	■	MHGE 100	27
180 mm	■	■	■	■	MHGE 200	27
340 mm	■	■	■	■	MHGE 400	27
740 mm	■	■	■	■	MHGE 800	27
80 mm	■	■	■		MHGP 100	53
180 mm	■	■	■		MHGP 200	53
340 mm	■	■	■		MHGP 400	53



Bearingless encoders

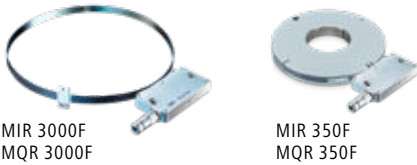
Absolute

	Hollow shaft (ø max.)	Absolute singletum	Absolute multitum	SSI	Analog	CANopen*	SAE J1939	EtherCAT / EtherNet/IP	Powerlink / Profinet	TTL/RS422	HTL/push-pull	SinCos 1 Vpp	Corrosion protection CX (C5-M)	Product family	Page
12 mm	■	■	■		■									EAM360 Kit	56
12 mm	■	■		■	■	■						■		EAM360R Kit	56
12 mm	■	■	■		■		■	■						EAM580 Kit	56
12 mm	■	■		■	■	■						■		EAM580R Kit	56
8 mm	■			■	■							■		EAM500R Kit	57
80 mm	■		■					■	■	■				MHAP 100	54
180 mm	■		■					■	■	■				MHAP 200	54
340 mm	■		■					■	■	■				MHAP 400	54



For large shaft diameters

	Hollow shaft (ø max.)	Incremental	Quasi-absolute	TTL/RS422	HTL/push-pull	HTL-Power Linedriver	SinCos 1 Vpp	Product family	Page
340 mm	■		■	■		■		MIR 350F	55
3183 mm	■		■		■			MIR 3000F	55
340 mm		■	■	■		■		MQR 350F	55
3183 mm		■	■		■			MQR 3000F	55



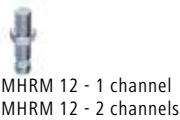
Analog magnetic rotary encoders

	Cylindrical design	Cubical design	Angular range 360°	Angular range 270°	Current output	Voltage output	Product family	Page
■		■		■	■		EAM500	57
■			■		■		MDRM 18I	57
■		■				■	MDRM 18U	57
	■		■	■			MDFM 20I	57
	■	■				■	MDFM 20U	57



Hall and speed sensors

	Design M12	Design M18	Switching frequency 0 to 15 kHz	Switching frequency 0 to 20 kHz	Push-pull output	PNP output	Product family	Page
■		■		■			MHRM 12 - 1 channel	59
■		■		■			MHRM 12 - 2 channels	59



Programmable encoders

	Size (ø)	Solid shaft	Blind hollow shaft	Through hollow shaft	Pulses per revolution	Output signal level	Zero pulse	TTL/RS422	HTL/push-pull	Outputs	Speed switches	HeavyDuty applications	Programmable Handheld, PC	WLAN adapter / browser	Product family	Page
58 mm	■	■	■	■	■	■	■	■	1			■			EIL580P	62
80 mm		■	■	■	■	■	■	■	1			■			HS35P	8
105 mm	■			■		■	■	■	2	■	■		■		PMG 10P U0	30
115 mm		■	■		■	■	■	■	2	■	■		■		HMG 10P	30



For special applications

Encoders for hazardous environments

Size (ø)	Ex II 2G (ATEX/IECEx)	Ex II 2D/2G (ATEX)	Ex II 3D (ATEX)	Incremental	Absolute	Solid shaft	Hollow shaft	Programmable	TTL/RS422	HTL/push-pull	SinCos 1Vpp	SSI	Profibus-DP	HeavyDuty applications	Product family	Page
115 mm	■			■	■			■	■				■		EEx OG 9	23
115 mm	■			■	■						■		■		EEx OG 9 S	66
160 mm	■			■		■		■	■				■		EEx HOG 161	66
58 mm		■		■	■	■		■	■				■		ExEIL580	66
58 mm		■		■	■	■	■	■	■				■		ExEIL580P	66
70 mm			■		■	■						■	■		X 700 - SSI	67
70 mm			■		■	■						■	■		X 700 - Profibus-DP	67



Redundant absolute encoders

Size (ø)	Solid shaft	Hollow shaft	Bearingless encoders	Analog redundant	CANopen® redundant	Corrosion protection CX (C5-M)	Product family	Page
28,6 mm	■		■	■			EAM280	14
50 mm		■	■	■	■		EAM500R Kit	68
58 mm	■	■			■	■	EAM580R	68



SIL encoders incremental

Size	SIL3	SIL2	Solid shaft	Hollow shaft	TTL/RS422	HTL/push-pull	SinCos 1Vpp	Product family	Page
ø58 mm		■	■		■	■		EIL576S-S	69
ø58 mm	■	■		■			■	EIL576S-T	69
ø105 mm		■		■	■	■		HOGS 100S	28
100 mm	■	■			■	■		GMM2xxS	70



For special applications

Offshore encoders

Size (ø)	Inkremental	Absolut Singleturn	Absolut Multiturn	Solid shaft	Hollow shaft	TTL/RS422	HTL/Power Line driver	SSI / SSI + incremental	CANopen*	DeviceNet	EtherCAT / EtherNet/IP	Profibus-DP	Speed switches	Product family	Page
115 mm	■		■		■	■								POG 10	23
115 mm	■		■		■	■						■		POG 11	23
115 mm	■		■		■									POG 83	72
105 mm	■			■	■	■								HOG 10	25
105 mm	■			■	■	■						■		HOG 11	25
100 mm	■			■	■	■	■							MHGE 100	72
813 mm	■			■	■	■	■							MHGE 800	72
105 mm	■	■	■		■	■	■	■	■	■	■	■	■	HMG 10	30
115 mm	■	■	■		■	■		■	■	■	■	■	■	PMG 10	30



Inclination sensors

Size	Measuring range 1-dim. / 0...360°	Measuring range 2-dim. / up to ±90°	Analogue	CANopen*	SAE J1939	Corrosion protection CX (C5-M)	ISO 13849 compliant firmware	Dynamic inclination sensors	Product family	Page
45 mm	■	■	■	■					GIM140R	76
48 mm	■	■	■	■	■	■	■		GIM500R	77
62 mm	■	■		■	■		■		GIM700DR	78



Acceleration sensors

Size	Redundant	SIL2/PLd Certification	Analogue	CANopen*	Product family	Page
48 mm		■	■		GAM500	79
55 mm		■	■		GAM900	79
55 mm	■	■	■	■	GAM900AS	79



Distance measurement

Cable transducers

Size	Measuring length max.	Absolute	SSI	Analogue / redundant	CANopen*	DeviceNet	Profibus-DP / EtherCAT	EtherNet/IP	Powerlink / Profinet	Product family	Page
88 mm	4,7 m	■		■	■					GCA3	82
88 mm	7,8 m	■		■	■					GCA5	82
126 mm	8 m	■		■	■					GCA8	82
126 mm	12 m	■		■	■					GCA12	82
222 mm	20 m	■		■	■					GCA20	82
60 mm	2,4 m	■	■		■	■	■	■	■	GCA2	83
96 mm	3 m	■	■		■	■	■	■	■	GCA4	83
115 mm	15 m	■	■		■	■	■	■	■	GCA15	83
200 mm	50 m	■	■		■	■	■	■	■	GCA50	83



Linear magnetic encoders / encoders with measuring wheels

Product family	Page	Product family	Page	Product family	Page
MIL10	84	MA20	85	EIL580P	62

