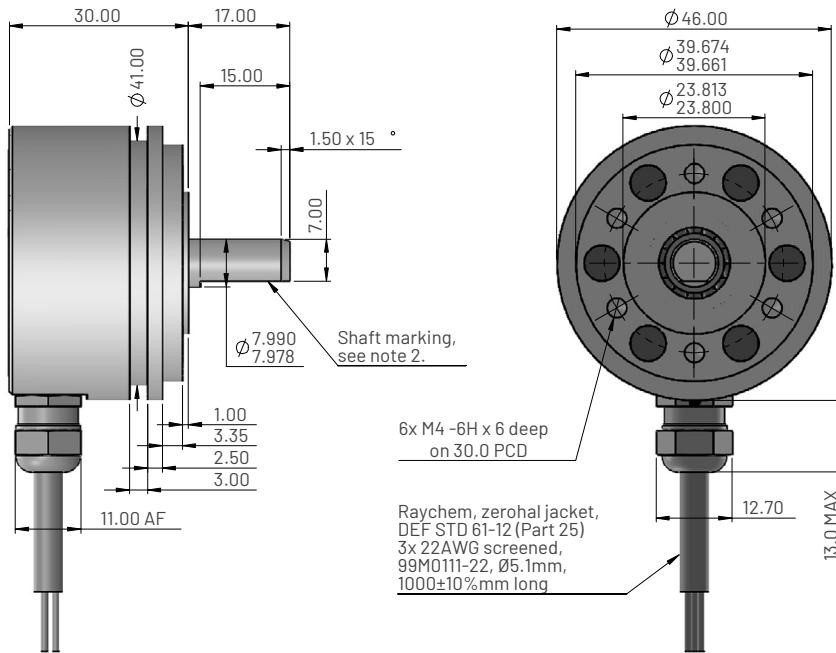


**Dimensions and electrical specification for MHR1811 YZ-XXX - Analogue Voltage Output**



**Ordering code**

**MHR1811 YZ-XXX**

Output direction (viewed on shaft)

- C = Clockwise
- A = Anticlockwise

Voltage output options

- 1 = 0 to +5
- 2 = 0 to +10
- 3 = -5 to +5
- 4 = -10 to +10

Electrical angle in degrees

**Input specification**

Supply voltage (Vs)	12 to 30	VDC
Over voltage protection	Up to 60	VDC
Supply current	<25	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Output type	Analogue voltage	
Output direction	Clockwise or Anticlockwise	
Voltage output options (Note 2)	(1 = 0 to +5)(2 = 0 to +10)(3 = -5 to +5)(4 = -10 to +10)	VDC
Line regulation	TBD	
Monotonic range	Linear Range (Note 5)	
Load resistance	>10	K Ohms
Output noise	<5 TBD	mV RMS
Short circuit protection	Yes (to supply or ground)	

**Performance specification**

Measurement range	20 to 360±2 in 1° increments	°
Resolution	TBD	% of measurement range
Non-linearity (Note 3)	<±0.25	%FS
Temperature coefficient	<±TBD	%FS/°C
Update rate (nominal)	500	Hz
Max operating speed	600	RPM

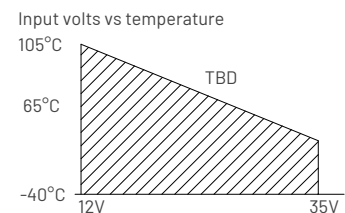
**General specification**

Weight (approx.)	100.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	
Storage temperature	-30 to +100	°C
Materials	Case: Anodised aluminium 6082, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Electrical connections (see note 1)**

Wire Colour	Function
Red	Supply Voltage (Vs)
White	Output Voltage (Vout)
Black	Ground

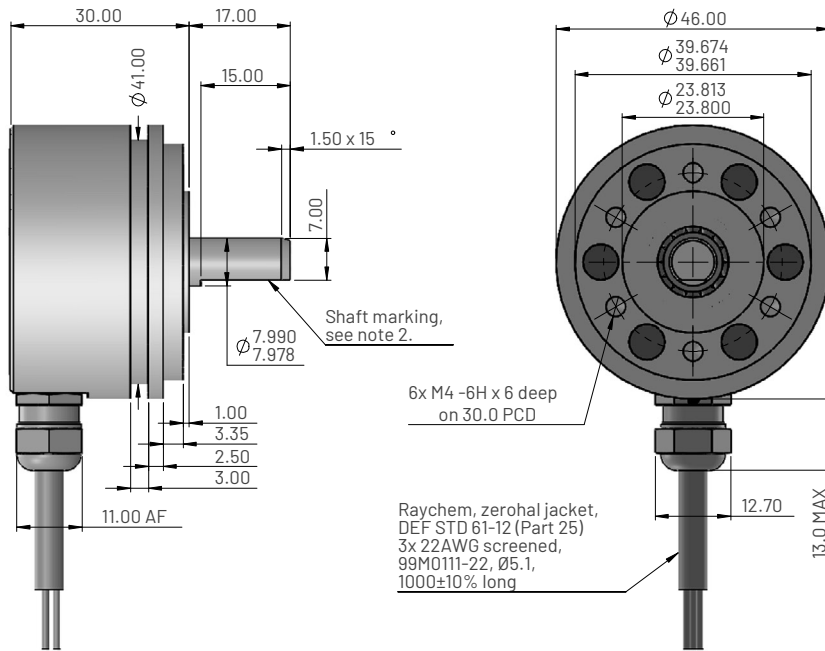
**Input voltage de-rating graph**



**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-voltage output.
3. Non-linearity is calculated from least squares best fit method over the Linear Range.
4. Due to hall effect technology used in this device, ferrous materials and magnetic fields close to the sensor may influence output.
5. Linear Range = Measurement range x 0.995 Nom.
6. General dimension tolerance is ±0.25mm.

**Dimensions and electrical specification for MHR1812 YZ-XXX - Analogue Current Output**



**Ordering code**

**MHR1812 YZ-XXX**

Output direction (viewed on shaft)

- C = Clockwise
- A = Anticlockwise

Voltage output options

- 1 = 4 to 20
- 2 = 0 to 20
- 3 = 0 to 24

Electrical angle in degrees

**Input specification**

Supply voltage (Vs)	12 to 40	VDC
Over voltage protection	Up to 60	VDC
Supply current	<50	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Output type	Analogue voltage	
Output direction	Clockwise or Anticlockwise	
Voltage output options (Note 2)	(1 = 4 to 20)(2 = 0 to 20)(3 = 0 to 24)	VDC
Line regulation	TBD	
Monotonic range	Linear Range (Note 5)	
Load resistance	>10	K Ohms
Output noise	<5 TBD	mV RMS
Short circuit protection	Yes (to supply or ground)	

**Performance specification**

Measurement range	20 to 360±2 in 1° increments	°
Resolution	TBD	% of measurement range
Non-linearity (Note 3)	<±0.25	%FS
Temperature coefficient	<±TBD	%FS/°C
Update rate (nominal)	500	Hz
Max operating speed	600	RPM

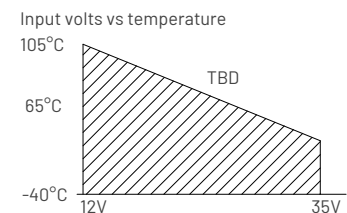
**General specification**

Weight (approx.)	200.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	
Storage temperature	-30 to +100	°C
Materials	Case: Anodised aluminium 6082, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Electrical connections (see note 1)**

Wire Colour	Function
Red	Supply Voltage (Vs)
White	Output Voltage (Vout)
Black	Ground

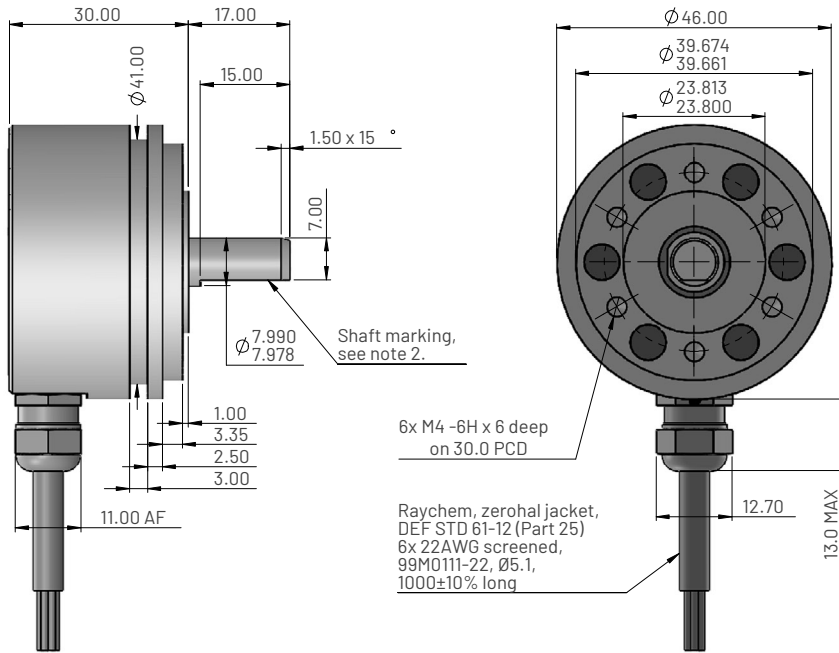
**Input voltage de-rating graph**



**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-voltage output.
3. Non-linearity is calculated from least squares best fit method over the Linear Range.
4. Due to hall effect technology used in this device, ferrous materials and magnetic fields close to the sensor may influence output.
5. Linear Range = Measurement range x 0.995 Nom.
6. General dimension tolerance is ±0.25mm.

**Dimensions and electrical specification for MHR1813-360, SAE J1939 Digital Output**



**Ordering code**

**MHR1813-360**

Electrical angle in degrees

**Input specification**

Supply voltage (Vs)	12 to 35	VDC
Over voltage protection	Up to 60	VDC
Supply current	<60 TBD	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Number of channels	1	
Output type	Digital	
Output information	Position and temperature	
Protocol	SAE J1939	
Node ID (UP)	0x64	
Baud rate (UP)	10, 20, 50, 125, 250 (*), 500, 800, 1000	KMbits/s
Position output direction (UP)	Clockwise (*) or Anticlockwise	
Position resolution	0.022 (14 bits)	% of measurement range
Temperature resolution	0.0078 (signed 16 bit)	°C
Frame rate (UP)	2, 10, 25, 50, 100, 250, 500, 1000 or polled (*)	ms
Output noise	<35 TBD	counts
Short circuit protection	Yes (to supply or ground) TBD	
Temperature update rate	240	ms

**Performance specification**

Position range	360	°
Position non-linearity (Note 3)	<±0.4 TBD	%FS
Position temperature coefficient	<±TBD	%FS/°C
Position update rate	500	Hz
Max operating speed	600	RPM
Temperature accuracy	<±1	°C

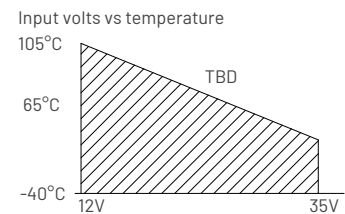
**General specification**

Weight (approx.)	100.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	°C
Storage temperature	-30 to +105	°C
Materials	Case: Anodised aluminium 6082, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Electrical connections (see note 1)**

Twisted pair	Wire Colour	Function
1	Red	Supply Voltage (Vs)
	Black	Ground
2	Blue	CAN-H
	Black	CAN-L

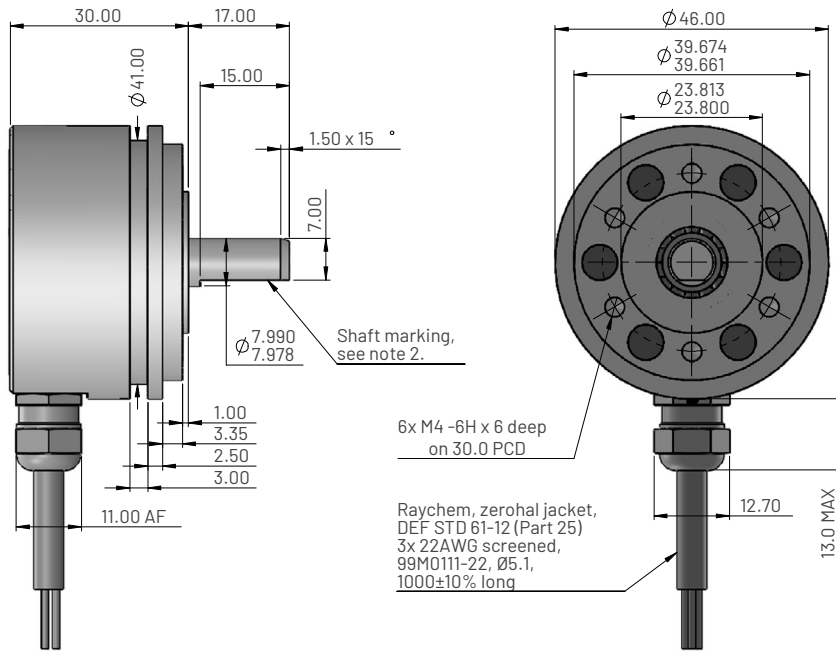
**Input voltage de-rating graph**



**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-travel (8192 counts).
3. Non-linearity is calculated from least squares best fit method.
4. (\*) denotes default options.
5. (UP) denotes user programmable.
6. General dimension tolerance is ±0.25mm.

**Dimensions and electrical specification for MHR1814-360, LIN Bus Digital Output**



**Ordering code**

**MHR1814-360**

Electrical angle in degrees

**Input specification**

Supply voltage (Vs)	7 to 18	VDC
Over voltage protection	Up to 30	VDC
Supply current	<40 TBD	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Number of channels	1	
Output type	Digital	
Output information	Position and temperature	
Protocol	LIN 1.3	
Node ID (Note 5)	0x20 (*)	
Baud rate	Up to 20	KMbits/s
Position output direction	Clockwise (*) or Anticlockwise	
Position resolution	0.022 (14 bits)	% of measurement range
Temperature resolution	0.0078 (signed 16 bit)	°C
Short circuit protection	Yes (to supply or ground) TBD	

**Performance specification**

Position range	360	°
Position noise	TBD	
Position non-linearity (Note 3)	<±0.4 TBD	%FS
Position temperature coefficient	<±TBD	%FS/°C
Update rate (nominal)	500	Hz
Max operating speed	600	RPM
Temperature accuracy	<±1	°C

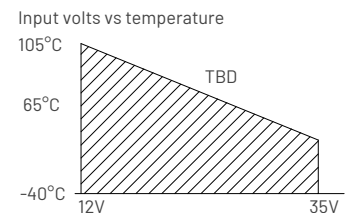
**General specification**

Weight (approx.)	100.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	°C
Storage temperature	-30 to +105	°C
Materials	Case: Anodised aluminium 6082, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Electrical connections (see note 1)**

Wire Colour	Function
Red	Supply Voltage (Vs)
Brown	LIN bus
Black	Ground

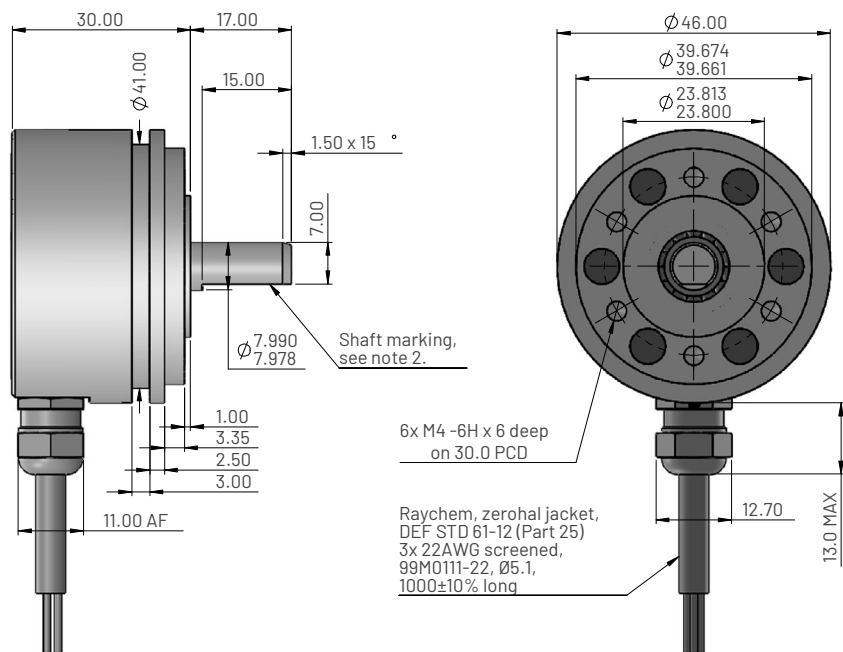
**Input voltage de-rating graph**



**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-travel (8192 counts).
3. Non-linearity is calculated from least squares best fit method.
4. (\*) denotes default options.
5. (UP) denotes user programmable.
6. General dimension tolerance is ±0.25mm.

**Dimensions and electrical specification for MHR1814-360, LIN Bus Digital Output**



**Ordering code**

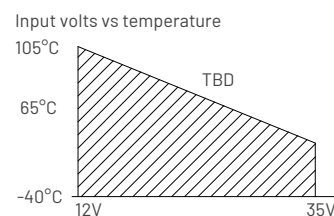
**MHR1814-360**

Electrical angle in degrees \_\_\_\_\_

**Electrical connections (see note 1)**

Wire Colour	Function
Red	Supply Voltage (Vs)
Brown	LIN bus
Black	Ground

**Input voltage de-rating graph**



**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-travel (8192 counts).
3. Non-linearity is calculated from least squares best fit method.
4. (\*) denotes default options.
5. (UP) denotes user programmable.
6. General dimension tolerance is  $\pm 0.25$ mm.

**Input specification**

Supply voltage (Vs)	7 to 18	VDC
Over voltage protection	Up to 30	VDC
Supply current	<40 TBD	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Number of channels	1	
Output type	Digital	
Output information	Position and temperature	
Protocol	LIN 1.3	
Node ID (Note 5)	0x20 (*)	
Baud rate	Up to 20	KMbits/s
Position output direction	Clockwise (*) or Anticlockwise	
Position resolution	0.022 (14 bits)	% of measurement range
Temperature resolution	0.0078 (signed 16 bit)	°C
Short circuit protection	Yes (to supply or ground) TBD	

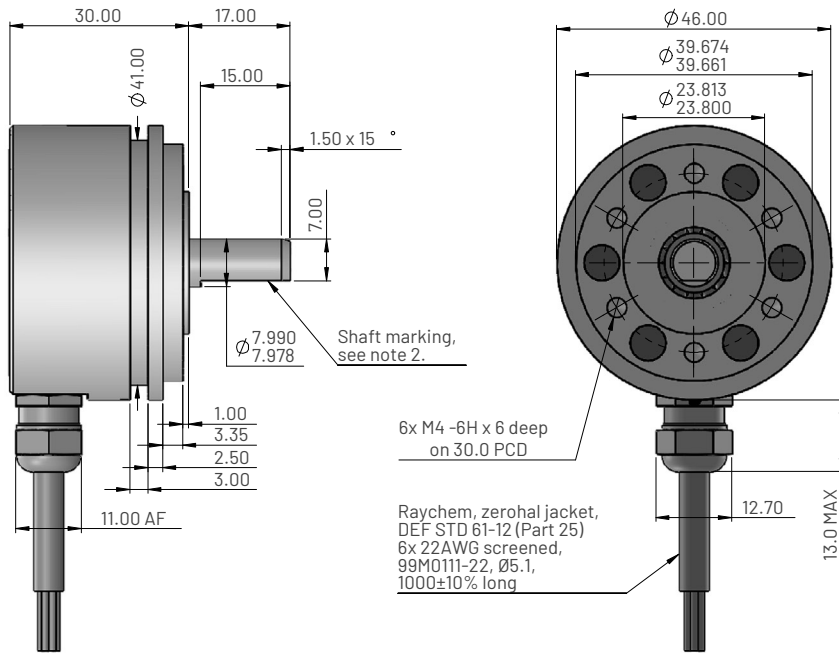
**Performance specification**

Position range	360	°
Position noise	TBD	
Position non-linearity (Note 3)	< $\pm 0.4$ TBD	%FS
Position temperature coefficient	< $\pm$ TBD	%FS/°C
Update rate (nominal)	500	Hz
Max operating speed	600	RPM
Temperature accuracy	< $\pm 1$	°C

**General specification**

Weight (approx.)	100.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	°C
Storage temperature	-30 to +105	°C
Materials	Case: Anodised aluminium 6082, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Dimensions and electrical specification for MHR1815-360, SSI Digital Output**



**Ordering code**

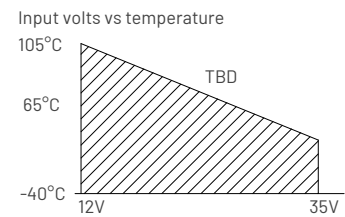
**MHR1815-360**

Electrical angle in degrees \_\_\_\_\_

**Electrical connections (see note 1)**

Wire Colour	Function
Red	Supply Voltage (Vs)
Brown	LIN bus
Black	Ground

**Input voltage de-rating graph**



**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-travel (8192 counts).
3. Non-linearity is calculated from least squares best fit method.
4. (\*) denotes default options.
5. (UP) denotes user programmable.
6. General dimension tolerance is  $\pm 0.25$ mm.

**Input specification**

Supply voltage (Vs)	12 to 35	VDC
Over voltage protection	Up to 60	VDC
Supply current	<60 TBD	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Number of channels	1	
Output type	Digital	
Position output direction	Clockwise	
Output information	Position and temperature	
Physical layer	RS485	
Max clock rate	100	Khz
Transfer timeout	20TBD	ms
Position resolution	0.022 (14 bits)	% of measurement range
Temperature resolution	0.0078 (signed 16 bit)	°C
Short circuit protection	Yes (to supply or ground)	
Temperature update rate	240	ms

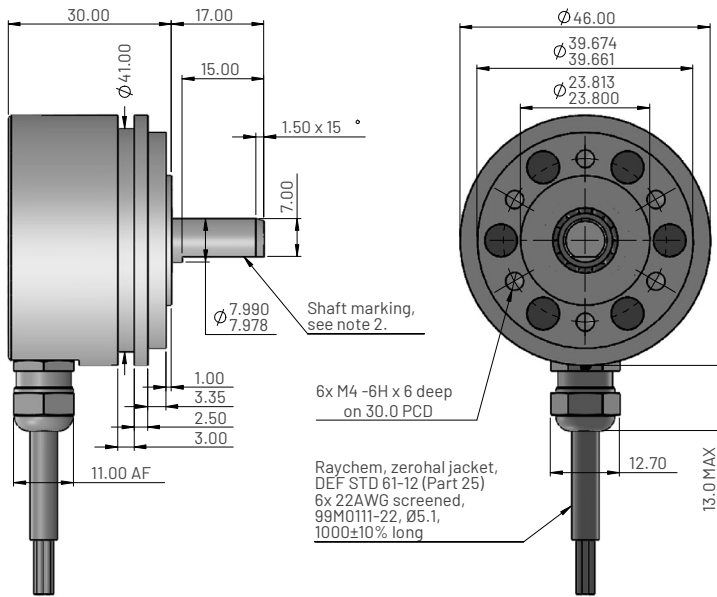
**Performance specification**

Position range	360	°
Position noise	TBD	counts
Position non-linearity (Note 3)	$\leq \pm 0.4$ TBD	%FS
Position temperature coefficient	$\leq \pm$ TBD	%FS/°C
Position update rate	500	Hz
Max operating speed	600	RPM
Temperature accuracy	$\leq \pm 1$	°C

**General specification**

Weight (approx.)	100.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	°C
Storage temperature	-30 to +105	°C
Materials	Case: Anodised aluminium 6082, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Dimensions and electrical specification for MHR1816-360 Z-360, MOD Bus RTU Digital Output**



**Ordering code**

**MHR1816 Z-360**

Physical layer options

1 = Half duplex

2 = Full duplex

Electrical angle in degrees

**Input specification**

Supply voltage (Vs)	12 to 35	VDC
Over voltage protection	Up to 60	VDC
Supply current	<60 TBD	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Number of channels	1	
Output type	Digital	
Output information	Position and temperature	
Protocol	MODBUS RTU	
Physical layer	RS485 Half or full duplex	
Node ID (Note 5)	0x1C (*)	
Baud rate (Note 5)	1200, 2400, 4800, 9600 (*), 19200, 38400, 57600, 76800, 115200	bps
Parity (Note 5)	Even (*), Odd, None	
Stop bits	1	
Position output direction (Note 5)	Clockwise (*) or Anticlockwise	
Position resolution	0.022 (14 bits)	% of measurement range
Temperature resolution	0.0078 (signed 16 bit)	°C
Short circuit protection	Yes (to supply or ground)	
Temperature update rate	240	ms

**Performance specification**

Position range	360	°
Position noise	<TBD	counts
Position non-linearity (Note 3)	<±0.4 TBD	%FS
Position temperature coefficient	<±TBD	%FS/°C
Position update rate	500	Hz
Max operating speed	600	RPM
Temperature accuracy	<±1	°C

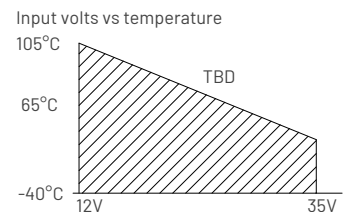
**General specification**

Weight (approx.)	100.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	°C
Storage temperature	-30 to +105	°C
Materials	Case: Anodised aluminium 6082, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Electrical connections (see note 1)**

Twisted Pair	Wire Colour	Half Duplex	Full Duplex
1	Red	Vs	Vs
	Black	GND	GND
2	Blue	Rx + / Tx +	Rx +
	Black	Rx - / Tx -	Rx -
3	White	Nc	Tx +
	Black	Nc	Tx -

**Input voltage de-rating graph**

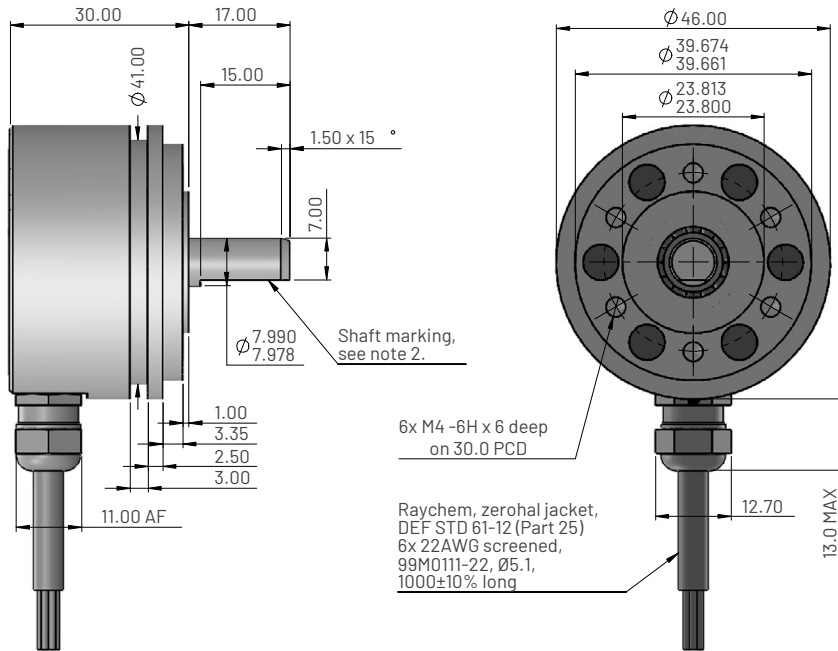


**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-travel (8192 counts).
3. Non-linearity is calculated from least squares best fit method.
4. (\*) denotes default options.
5. (UP) denotes user programmable.
6. General dimension tolerance is ±0.25mm.



**Dimensions and electrical specification for MHR1817-360, CAN Open Digital Output**



**Ordering code**

**MHR1817-360**

Electrical angle in degrees

**Input specification**

Supply voltage (Vs)	12 to 35	VDC
Over voltage protection	Up to 60	VDC
Supply current	<60 TBD	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Number of channels	1	
Output type	Digital	
Output information	Position	
Protocol	CANOpen CiA DS301	
Profile	CiA DS406 Class C1	
Node ID (Note 5)	0x64	
Baud rate (Note 5)	10, 20, 50, 125, 250 (*), 500, 800, 1000	Mbits/s
Position output direction (Note 5)	Clockwise (*) or Anticlockwise	
Position resolution	0.022 (14 bits)	% of measurement range
Frame rate (Note 5)	2, 10, 25, 50, 100, 250, 500, 1000 or polled (*)	ms
Output noise	<TBD	counts
Short circuit protection	Yes (to supply or ground) TBD	

**Performance specification**

Position range	360	°
Position non-linearity (Note 3)	<±0.4 TBD	%FS
Position temperature coefficient	<±TBD	%FS/°C
Position update rate	500	Hz
Max operating speed	600	RPM
Temperature accuracy	<±1	°C

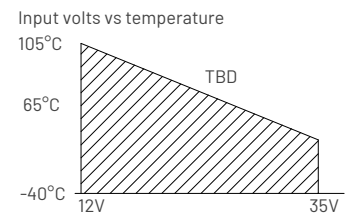
**General specification**

Weight (approx.)	100.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	°C
Storage temperature	-30 to +105	°C
Materials	Case: Anodised aluminium 6082, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Electrical connections (see note 1)**

Twisted pair	Wire Colour	Function
1	Red	Supply Voltage (Vs)
	Black	Ground
2	Blue	CAN-H
	Black	CAN-L

**Input voltage de-rating graph**

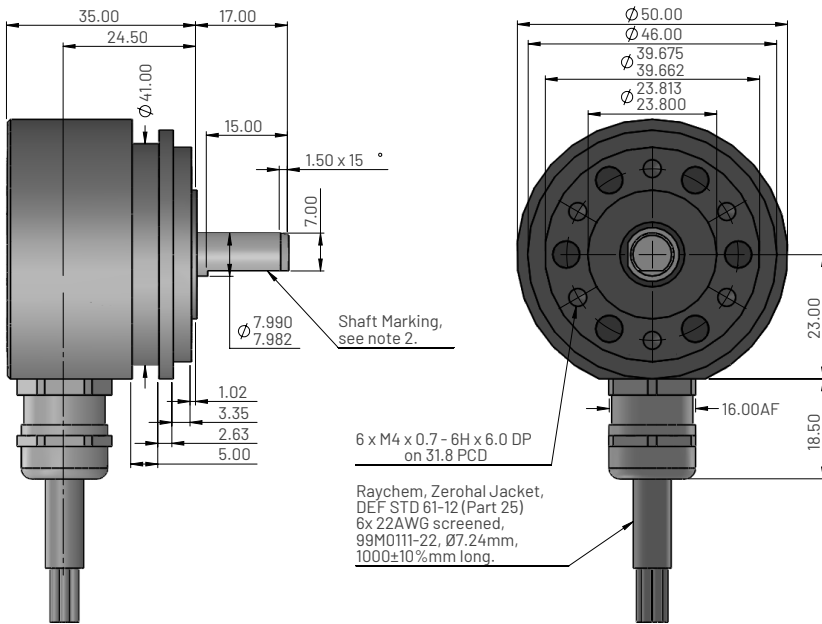


**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-travel (8192 counts).
3. Non-linearity is calculated from least squares best fit method.
4. (\*) denotes default options.
5. (UP) denotes user programmable.
6. General dimension tolerance is ±0.25mm.



**Dimensions and electrical specification for MHR1822 YZ-XXX - Analogue Current Output**



**Ordering code**

**MHR1822 YZ-XXX**

Output direction (viewed on shaft)

- C = Clockwise
- A = Anticlockwise
- D = Channel 1 output anticlockwise  
Channel 2 output clockwise

Current output options

- 1 = 4 to 20 mA
- 2 = 0 to 20 mA
- 3 = 0 to 24 mA

Electrical angle in degrees

**Input specification**

Supply voltage (Vs)	12 to 40	VDC
Over voltage protection	Up to 60	VDC
Supply current	<50	mA
Reverse polarity protection	Up to -40	VDC
Power on settlement time	<250	ms

**Output specification**

Output type	Analogue current	
Output direction	Clockwise or Anticlockwise	
Voltage output options (Note 2)	(1 = 4 to 20)(2 = 0 to 20)(3 = 0 to 24)	mA
Line regulation	TBD	
Monotonic range	Linear Range (Note 6)	%FS
Load resistance	>10	Ohms
Output noise	<5 TBD	mV RMS
Short circuit protection	Yes (to supply or ground)	

**Performance specification**

Measurement range	20 to 360±2 in 1° increments	°
Measurement range tolerance	±2	°
Resolution	TBD	% of measurement range
Non-linearity (Note 3)	<±0.25	%FS
Phasing (Note 4)	<0.5	%FS
Temperature coefficient	<±TBD	%FS/°C
Update rate (nominal)	500	Hz
Max operating speed	600	RPM

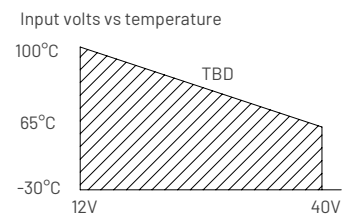
**General specification**

Weight (approx.)	230.0	grams
Protection/sealing	Electronic housing IP68 and IP69K	
Life (shaft bearing)	>500 million cycles	dependant on environment
Dither life	Contactless - no degradation due to shaft dither	
Operational temperature	See de-rating graph	
Storage temperature	-30 to +100	°C
Materials	Case: Anodised aluminium 6082 T6, Shaft: Stainless steel 316, Cable Gland: Brass, nickel plated	

**Electrical connections (see note 1)**

Wire Colour	Function
Red	Supply Voltage (Vs)
White	Output Voltage (Vout)
Black	Ground

**Input voltage de-rating graph**



**Notes**

1. Incorrect wiring may cause internal damage.
2. When shaft flat is facing cable exit, instrument is mid-current output.
3. Non-linearity is calculated from least squares best fit method over the Linear Range.
4. Phasing for the MHR1822 DV-XXX option is at mid-travel only.
5. Due to hall effect technology used in this device, ferrous materials and magnetic fields close to the sensor may influence output.
6. Linear Range = Measurement range x 0.995 Nom.
7. General dimension tolerance is ±0.25mm.