WACHENDORFF
The Encoder Experts

# WDGI 58B Series

The Wachendorff WDGI 58B is a rugged 58mm [2.283in] incremental rotary encoder designed as an industrial standard for motion feedback, speed, and position sensing in heavy-duty applications. Its stainless steel 10mm [0.394in] solid shaft rides on two precision ball bearings in a clamping flange housing of stainless steel, providing IP67 housing protection with the shaft sealed to IP65. Resolution options are available from 60 to 5000 pulses per revolution, and the wide 5–30 VDC supply with push-pull HTL outputs (TTL/RS422 compatible at 5 VDC) drops directly into virtually any PLC, drive, or counter input without additional interface hardware. A, B, and N (Z-pulse) channels plus inverted complements provide strong noise immunity over long cable runs, and all outputs include inverse-polarity and short-circuit protection.

**58B Clamping Flange**



## Features

- Resolution: 60, 100, 360, 500, 1000, 1024, 2000, 2500, 4096, 5000 models available
- ABN + inverted signals
- Reverse-polarity and short-circuit protection over a wide 5–30 VDC supply range
- High output frequency: up to 600 kHz (HTL) or 1 MHz (TTL)
- IP65/IP67 housing protection, IP65 at the shaft input
- HTL/TTL single ended or differential output with ABN + inverted channels, max. 40 mA per channel
- Stainless-steel housing; 2 precision ball bearings
- Max. operating speed: 8000 rpm
- Common M12 8-pin radial sensor connector across all variants, shield tied to housing
- High electrical immunity: 8 kV ESD (EN 61000-4-2), 2 kV burst (EN 61000-4-4), EMC per EN 61000-6-2 / 61000-6-3
- Vibration resistant to 50 $m/s^2$ (10 to 2000 Hz); shock resistant to 1000 $m/s^2$ (6 ms)
- 5-year warranty, cULus, Made in Germany

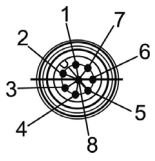
## Wachendorff WDGI 58B Series Encoders

| AutomationDirect Part Number | Wachendorff Part Number | Price | Output Circuit | Pulses per Revolution | Dimensional Drawing | Shaft/Bore Diameter | Flange Diameter | Input Voltage | Output |
|---|---|---|---|---|---|---|---|---|---|
| 58B10603GSC8 | WDGI 58B-10-60-ABN-M35-SC8 | $150.00 | M35 | 60 | PDF | 10mm solid shaft | 58mm | 5–30 VDC | HTL, inv. (TTL/RS422 comp. at 5 VDC) |
| 58B101003GSC8 | WDGI 58B-10-100-ABN-M35-SC8 | $150.00 | | 100 | PDF | | | | |
| 58B103603GSC8 | WDGI 58B-10-360-ABN-M35-SC8 | $150.00 | | 360 | PDF | | | | |
| 58B105003GSC8 | WDGI 58B-10-500-ABN-M35-SC8 | $150.00 | | 500 | PDF | | | | |
| 58B1010003GSC8 | WDGI 58B-10-1000-ABN-M35-SC8 | $150.00 | | 1000 | PDF | | | | |
| 58B1010243GSC8 | WDGI 58B-10-1024-ABN-M35-SC8 | $150.00 | | 1024 | PDF | | | | |
| 58B1020003GSC8 | WDGI 58B-10-2000-ABN-M35-SC8 | $150.00 | | 2000 | PDF | | | | |
| 58B1025003GSC8 | WDGI 58B-10-2500-ABN-M35-SC8 | $150.00 | | 2500 | PDF | | | | |
| 58B1040963GSC8 | WDGI 58B-10-4096-ABN-M35-SC8 | $150.00 | | 4096 | PDF | | | | |
| 58B1050003GSC8 | WDGI 58B-10-5000-ABN-M35-SC8 | $150.00 | | 5000 | PDF | | | | |

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# WDGI 58B Series

## WDGI 58B Wiring

| Wachendorff WDGI 58B Connector Pinout | | | |
|---|---|---|---|
| ***8-Pin Connector*** | ***Signal*** | ***Pin*** | ***Murrelektronik Wire Colors Part# 7000-170x1-292xxxx or 7024-171x1-406xxxx*** |
|  | GND | 1 | White |
| | V+ | 2 | Brown |
| | A | 3 | Green |
| | B | 4 | Yellow |
| | N | 5 | Gray |
| | A inv. | 6 | Pink |
| | B inv. | 7 | Blue |
| | N inv. | 8 | Red |



***Circuit protection:***
Reversing the polarity of the input power supply while simultaneously short-circuiting the outputs to each other or to GND or V+ will not result in damage.

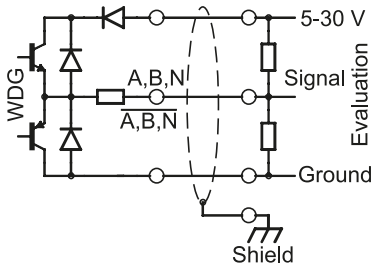
- Applying GND and V+ to two outputs is not permitted and can lead to failure.

***Power Supply Inverse-polarity protection:***
Encoders have reverse polarity protection and can be mis-wired without concern of damage to the encoder. Reversing the connection cables of the power supply when the outputs are connected correctly will not result in damage. However, the encoder will not function properly.

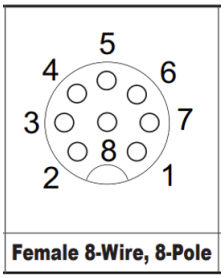
***Output Short circuit protection:***
Requirements:

- Supply lines must not be reversed!
- Only one output is short-circuit-proof against GND, V+ (max. allowable supply voltage) or another output.

### M35 Output Circuit




| ***Part Number*** | ***Connector*** | ***Length*** | ***Protection Degree*** | ***Shielding*** |
|---|---|---|---|---|
| 7000-17041-2920xx0 | Axial female | xx=03, 05, or 10 (3, 5, or 10m) | IP65/IP66/IP67 | None |
| 7000-17061-2920xx0 | 90-degree female | | | |
| 7024-17121-406xxx0 | Axial female | xxx=015, 050, or 100 (1.5, 5, or 10m) | IP65/IP68/IP69K | Copper braid, tinned |
| 7024-17141-406xxx0 | 90-degree female | | | |



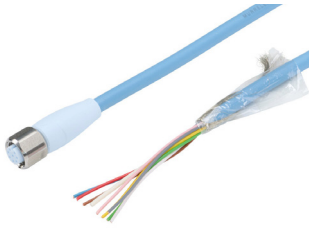

**Female 8-Wire, 8-Pole**



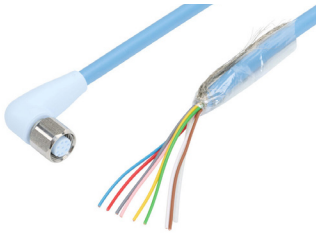
**Unshielded Axial**



**Unshielded 90-degree**



**Shielded Axial**



**Shielded 90-degree**

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# WDGI 58B Series

## Specifications - WDGI 58B Series

| WDGI 58B Series Specifications | | |
|---|---|---|
| Electrical Specifications | Resolution (PPR) | 60, 100, 360, 500, 1000, 1024, 2000, 2500, 4096, 5000 |
| | Operating Principle | Magnetic (non-contact) |
| | Output Signals | ABN and inverted signals |
| | Output Circuits | HTL, inv. (TTL/RS422 comp. at 5 VDC) |
| | Output | Push-pull |
| | Power Supply | 5–30 VDC |
| | Consumption | 40 mA (typical) |
| | Output Current (each channel) | 40 mA |
| | Signal Level mA | @ 20 mA |
| | Signal Level H | H > Vcc -10% Vcc |
| | Signal Level L | L < 2.5 VDC |
| | Output Frequency | HTL: max. 600 kHz; TTL: max. 1 MHz |
| | Protection | Inverse-polarity and short-circuit protection |
| | EMC | DIN EN 61000-6-2<br>DIN EN 61000-6-3 |
| Mechanical Specifications | Shaft/Bore Diameter Ø | 10mm [0.394in] |
| | Shaft/Bore Length | 20mm [0.787in] |
| | Flange Diameter Ø | 58mm [2.283in] |
| | Flange Type | clamping flange |
| | Max. Radial Shaft Load | 220N [22.433 kp] |
| | Max. Axial Shaft Load | 120N [12.236 kp] |
| | Starting Torque | Approx. 1 N•cm [1.416 in-ozf] at ambient temperature |
| | Bearings | 2 precision ball bearings |
| | Max. Mechanical Operating Speed | 8000 rpm* |
| | Nominal Service Life | $1\times10^{9}$ rev. @ 100% shaft load; $1\times10^{11}$ rev. @ 20% rated shaft load |
| | Electrical Connection | 8-pin M12 A-coded |
| | Weight | 250g [8.818 oz] |
| Materials | Flange | Aluminum |
| | Housing | Stainless steel |
| | Shaft | Stainless steel |
| Environmental Specifications | Protection | IP65/IP67 housing + IP65 at shaft input (EN 60529) |
| | Operating Temperature | -40 to +85 °C [-40 to +185 °F] |
| | Storage Temperature | -40 to +85 °C [-40 to +185 °F] |
| | Vibration | 50 m/s² (10–2000 Hz) per DIN EN 60068-2-6 |
| | Shock | 1000 m/s² (6 ms) per DIN EN 60068-2-27 |
| | Electrical Safety | according to DIN VDE 0160 |
| | Approvals | CE, cULus |

*** Note: Due to frequency limits some maximum speeds may be lower than the mechanical max.**
**Use the following formula to determine the maximum electrical speed: Max RPM = f_max(Hz) × 60 ÷ PPR**

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# Encoder Accessories

## Measuring Wheels - Wachendorff Encoders

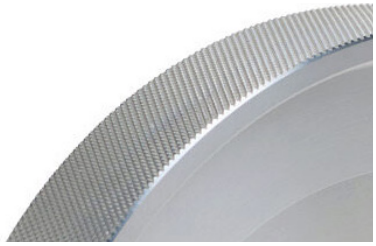
| Measuring Wheels for Wachendorff Series Encoders | | | | | |
|---|---|---|---|---|---|
| *AutomationDirect Part Number* | *Price* | *Description* | *C* | *Material* | *For Use With* |
| ***MR200KG06*** | $73.00 | Wachendorff Automation encoder measuring wheel, 63.7mm diameter (200mm circumference), 6mm shaft, aluminum and plastic, grooved Hytrel contact surface. | 200mm | Grooved Hytrel | Any 6mm shaft encoder |
| ***MR200KH06*** | $73.00 | Wachendorff Automation encoder measuring wheel, 63.7mm diameter (200mm circumference), 6mm shaft, aluminum and plastic, smooth Hytrel contact surface. | | Smooth Hytrel | |
| ***MR200KR06*** | $76.00 | Wachendorff Automation encoder measuring wheel, 63.7mm diameter (200mm circumference), 6mm shaft, aluminum, knurled metal contact surface. | | Knurled Metal | |
| ***MR200NG06*** | $89.00 | Wachendorff Automation encoder measuring wheel, 63.7mm diameter (200mm circumference), 6mm shaft, aluminum and plastic, pimpled rubber contact surface. | | Pimpled Rubber | |
| ***MR200KG10*** | $73.00 | Wachendorff Automation encoder measuring wheel, 63.7mm diameter (200mm circumference), 10mm shaft, aluminum and plastic, grooved Hytrel contact surface. | | Grooved Hytrel | Any 10mm shaft encoder |
| ***MR200KH10*** | $73.00 | Wachendorff Automation encoder measuring wheel, 63.7mm diameter (200mm circumference), 10mm shaft, aluminum and plastic, smooth Hytrel contact surface. | | Smooth Hytrel | |
| ***MR200KR10*** | $76.00 | Wachendorff Automation encoder measuring wheel, 63.7mm diameter (200mm circumference), 10mm shaft, aluminum, knurled metal contact surface. | | Knurled Metal | |
| ***MR200NG10*** | $89.00 | Wachendorff Automation encoder measuring wheel, 63.7mm diameter (200mm circumference), 10mm shaft, aluminum, pimpled rubber contact surface. | | Pimpled Rubber | |
| ***MR500KH10*** | $120.00 | Wachendorff Automation encoder measuring wheel, 159.2mm diameter (500mm circumference), 10mm shaft, aluminum and plastic, smooth Hytrel contact surface. | 500mm | Smooth Hytrel | Any 10mm shaft encoder |
| ***MR500KG10*** | $120.00 | Wachendorff Automation encoder measuring wheel, 159.2mm diameter (500mm circumference), 10mm shaft, aluminum and plastic, grooved Hytrel contact surface. | | Grooved Hytrel | |
| ***MR500NG10*** | $146.00 | Wachendorff Automation encoder measuring wheel, 159.2mm diameter (500mm circumference), 10mm shaft, aluminum, pimpled rubber contact surface. | | Pimpled Rubber | |
| ***MR500KR10*** | $131.00 | Wachendorff Automation encoder measuring wheel, 159.2mm diameter (500mm circumference), 10mm shaft, aluminum, knurled metal contact surface. | | Knurled Metal | |
| ***MR500KV10*** | $146.00 | Wachendorff Automation encoder measuring wheel, 159.2mm diameter (500mm circumference), 10mm shaft, aluminum, smooth vulcanized rubber contact surface. | | Vulcanized Rubber | |



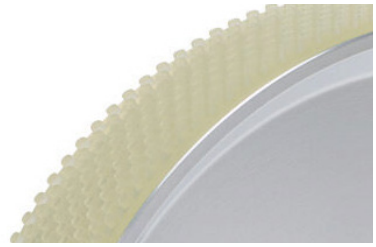
Grooved Hytrel



Smooth Hytrel



Knurled Metal



Pimpled Rubber



Smooth Vulcanized Rubber

## Measuring Wheels, *continued*



MR200KG10



MR500KH10

| Measuring Wheel Selection Guide | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Fields of Application* | *Surface Finish* | *Hardness Shore A* | *Wheel Body Material* | *Circumference* | *Standard Bore-hole Diameter* | *Width* | *Est. Weight* | *Part* |
| Rubber, soft plastics, certain textiles, rough wood | Metal, knurled | – | Aluminum | 200mm | 6mm | 12mm | 60g | MR200KR06 |
| | | | | | 10mm | | | MR200KR10 |
| | | | | 500mm | 10mm | 25mm | 350g | MR500KR10 |
| Wood with even surface, plastics, wire, greased metals | Hytrel, smooth | 85–90 | Plastic | 200mm | 6mm | 12mm | 35g | MR200KH06 |
| | | | | | 10mm | | | MR200KH10 |
| | | | | 500mm | 10mm | 25mm | 260g | MR500KH10 |
| Carpets, coarse textiles | Rubber, pimpled | – | Aluminum | 200mm | 6mm | 12mm | 37g | MR200NG06 |
| | | | | | 10mm | | | MR200NG10 |
| | | | | 500mm | 10mm | 25mm | 320g | MR500NG10 |
| Paper, pasteboard, cable, ungreased metal, raw wood, plastics, textiles, floor coverings, leather | Hytrel, grooved | 85–90 | Plastic | 200mm | 6mm | 12mm | 35g | MR200KG06 |
| | | | | | 10mm | | | MR200KG10 |
| | | | | 500mm | 10mm | 25mm | 260g | MR500KG10 |
| Paper, pasteboard, cable, ungreased metal, raw wood, plastics, wire | Vulcanized rubber, smooth | 90–95 | Aluminum | 500mm | 10mm | 25mm | 320g | MR500KV10 |

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# Encoder Accessories

## Spring-loaded Arms - Wachendorff Encoders

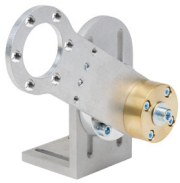
| Spring-loaded Arms for Wachendorff Series Encoders | | | | | |
|---|---|---|---|---|---|
| ***AutomationDirect Part Number*** | ***Price*** | ***Description***** | ***Wheel Size*** | ***Circumference*** | ***For Use With*** |
| ***WDGMA10000*** | $160.00 | Wachendorff Automation spring-loaded counter-clockwise arm, aluminum. Mounting bracket included. | 200mm or 500mm | 10mm shaft | Wachendorff 58B and 58V series encoders<br><br>Lika Electronic AM58S and AQ58S series encoders |
| ***WDGMA10002*** | $160.00 | Wachendorff Automation spring-loaded clockwise arm, aluminum. Mounting bracket included. | | | |
| ***WDGMA51051*** | $244.00 | Wachendorff Automation spring-loaded counter-clockwise arm, aluminum. Mounting bracket included. | | | |
| ***WDGMA51052*** | $244.00 | Wachendorff Automation spring-loaded clockwise arm, aluminum. Mounting bracket included. | | | |
| ***WDGMA31031**** | $191.00 | Wachendorff Automation spring-loaded counter-clockwise arm, aluminum. Mounting bracket included. | 200mm | 6mm and 10mm shafts | Wachendorff 36A and 36J series encoders |
| ***WDGMA31032**** | $191.00 | Wachendorff Automation spring-loaded clockwise arm, aluminum. Mounting bracket included. | | | |

*** WDGMA3103x are designed for 200mm wheels. These arms will work with 500mm wheels, but the wheels must be removed to adjust the arm tension.**
**** See the next page for a visual explanation of clockwise vs. counter-clockwise arms.**

**Note: For a complete linear measurement system select a spring-loaded arm, choose an encoder that will mount to it, then select a wheel with the desired circumference (and bore size to match the encoder's solid shaft).**



WDGMA31031



WDGMA10000



WDGMA51051



WDGMA31032



WDGMA10002



WDGMA51052

## Spring-loaded Arms, *continued*



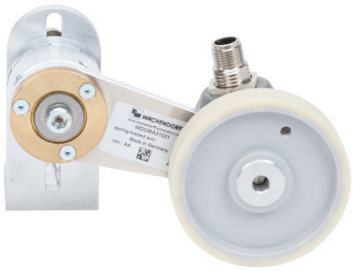
**Spring-loaded clockwise:**
**WDGMA10002**



**Spring-loaded counter-clockwise:**
**WDGMA10000**



**Spring-loaded clockwise:**
**WDGMA31032**



**Spring-loaded counter clockwise:**
**WDGMA31031**



**Spring-loaded clockwise:**
**WDGMA51052**

**Spring-loaded counter clockwise:**
**WDGMA51051**

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## Accessories - Wachendorff Encoders

| Accessories for Wachendorff Series Encoders | | | |
|---|---|---|---|
| *AutomationDirect Part Number* | *Price* | *Description* | *For Use With* |
| *DSK290606* | $33.00 | Wachendorff Automation encoder coupling, double loop, galvanized steel and polyurethane, setscrew, size 29, 6 x 6mm bore. | Any 6mm shaft encoder |
| *FB29B0606* | $58.00 | Wachendorff Automation encoder coupling, bellows, stainless steel and aluminum, setscrew, size 29, 6 x 6mm bore. | |
| *DSK291010* | $33.00 | Wachendorff Automation encoder coupling, double loop, galvanized steel and polyurethane, setscrew, size 29, 10 x 10mm bore. | Any 10mm shaft encoder |
| *DSK481010* | $63.00 | Wachendorff Automation encoder coupling, double loop, galvanized steel and polyurethane, setscrew, size 48, 10 x 10mm bore. | |
| *FB29B1010* | $58.00 | Wachendorff Automation encoder coupling, bellows, stainless steel and aluminum, setscrew, size 29, 10 x 10mm bore. | |
| *MG58A* | $62.00 | Wachendorff Automation mounting bell, 68mm and 75mm bolt hole circles, Fortron PPS. | Wachendorff 58A series encoders |
| *MW58B* | $28.00 | Wachendorff Automation right angle bracket, aluminum. | Wachendorff 58B or 58V series encoders |
| *QF58B* | $28.00 | Wachendorff Automation square mounting flange, 48mm bolt hole square, anodized aluminum. | |
| *WDGDH10000* | $196.00 | Wachendorff Automation spring-loaded encoder mount, aluminum. | |
| *WDGQF58B04* | $17.00 | Wachendorff Automation square mounting flange, 65–75mm adjustable bolt hole circle, aluminum. | |
| *SP300** | $26.00 | Wachendorff Automation servo mount clamp, steel. | Wachendorff 36A, 36J, 58A, and 58B series encoders |

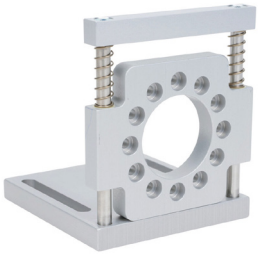
*** Note: ADC Part Number SP300 is Wachendorff Part Number SP-3-00.**



SP300



QF58B



WDGDH10000



DSK290606



WDGQF58B04



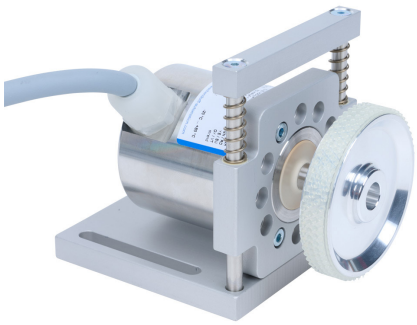
MG58A



FB29B0606



MW58B



WDGDH10000 (shown with 58V encoder and wheel, sold separately)

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# Encoder Accessories

## Encoder Signal Conditioner/Splitter - Wachendorff Encoders



The Wachendorff WDG012VGOM is a compact, DIN rail-mounted encoder distributor designed to condition, split, and cross-switch incremental encoder signals in industrial control systems. The WDG012VGOM is a universal encoder interface: the unit accepts two separate quadrature (A/B/Z or A/B or just A) encoder inputs and delivers two sets of quadrature signals out, with each set of outputs adjustable to HTL, TTL, (single-ended) or RS422 (differential) levels. The WDG012VGOM can act as an encoder level converter, a dual-output encoder splitter, or a contactless encoder signal switcher controlled via remote logic inputs. It handles both symmetric (differential) and asymmetric (single-ended) signal formats across the A, B, and Z channels, supports frequencies up to 1 MHz, and always regenerates full differential output pairs even when only single-ended signals are applied at the input. An integrated auxiliary 5 VDC output simplifies encoder power supply wiring, while front-panel LEDs provide at-a-glance diagnostics of operating mode and control-input status.

## Features

- Universal encoder interface, applicable as level converter, encoder splitter and cross switch
- Two encoder inputs (A, /A, B, /B, Z, /Z), adjustable either to HTL, TTL or RS422 level
- Suitable for symmetrical (differential), asymmetrical (single-ended) quadrature as well as single channel signals
- Two signal outputs (A, /A, B, /B, Z, /Z), adjustable either to HTL, TTL or RS422 level
- Contactless and bounce-free switch-over between the encoder channels, by remote control signals
- Auxiliary output 5 VDC for encoder supply
- High frequency range up to 1 MHz
- Three primary applications:
  - Dual level converter (adjust/change/extend signals from two separate encoder inputs to two separate encoder outputs)
  - Encoder splitter (one input split into dual output)
  - Encoder signal switcher (one or two encoder inputs can be crossed/switched on the fly to two different outputs via digital inputs Control1 and Control2)

### Signal Conditioner for Wachendorff Series Encoders

| AutomationDirect Part Number | Price | Description | Drawing | For Use With |
|---|---|---|---|---|
| WDG012VGOM | $415.00 | Wachendorff Automation signal conditioner, isolated, Input: 2-channel, differential or single-ended line driver encoder, Output: 2-channel, differential or single-ended line driver encoder, 12–30 VDC operating voltage, 35mm DIN rail mount. | PDF | Any non-ethernet/ comms encoders |

### WDG012VGOM Specifications

| | | |
|---|---|---|
| Power Supply | Input Voltage | 12–30 VDC |
| | Protection Circuit | Reverse polarity protection |
| | Ripple | ≤ 10% at 24 VDC |
| | Consumption | Approximately 50 mA (unloaded) |
| Connections | Connector Type | Screw terminals, 1.5mm$^2$ / AWG16 |
| Encoder Supply | Output Voltages | 5.2 VDC and 10–28 VDC (approx. 2 VDC lower than input voltage) |
| | Output Current | Max. 125 mA |
| | Protection | Short-circuit proof |
| Incremental Encoder Inputs | Number of Inputs | 2 encoders |
| | Signal Levels | Adjustable to TTL (single ended <5V) / RS422 (differential signal > 1V) or HTL (10–30 V) |
| | Channels | Symmetrical: A, /A, B, /B, Z, /Z<br>Asymmetrical: A, B, Z |
| | Frequency | Symmetrical: max. 1 MHz<br>Asymmetrical: max. 250 kHz |
| | Internal Resistance | Ri ≈ 4.7 kOhm |
| Control DIP Switch | Number of Inputs | 2 |
| | Application | Contactless and bounce-free signal switchover |
| | Levels | HTL, PNP (10–30 V) |
| Incremental Encoder Outputs | Number of Outputs | 2 encoders |
| | Output Level | Adjustable to TTL / RS422 or HTL (12–30 V, ≙ power supply voltage) |
| | Channels | A, /A, B, /B, Z, /Z |
| | Output Current | RS422/TTL: 50 mA<br>HTL: max. 30 mA (per output) |
| | Output Circuit | Push-pull |
| | Signal Propagation Delay | Approximately 600 ns |
| | Protection | Short-circuit proof |
| Housing | Material | Plastic |
| | Mounting | 35mm DIN rail (according to EN 60715) |
| | Protection Class | IP20 |
| | Weight | ~ 100g |
| Temperature Range | Operation | -20 to +60 °C [-4 to +140 °F] (not condensing) |
| | Storage | -30 to +75 °C [-22 to +167 °F] (not condensing) |
| Failure Rate | MTBF in Years | 146.4 years (long-term usage at 60 °C [140 °F]) |
| Conformity and Standards | EMC 2004/108/EC | EN 61000-6-2, EN 61000-6-3, EN 61000-6-4 |
| | Guideline 2011 / 65 / EU | RoHs |

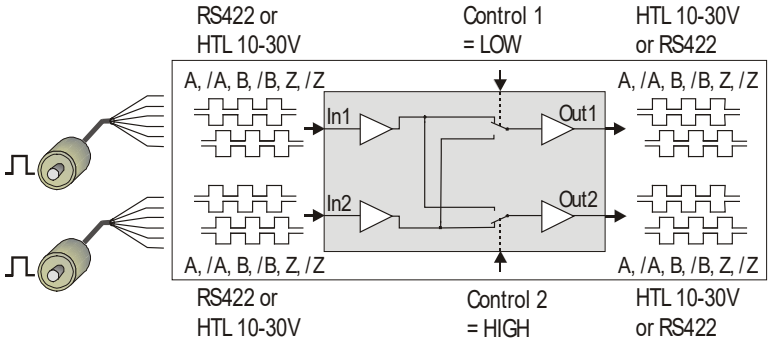
# Signal Conditioner - Applications

## Dual Level Converter

Both inputs can be individually set to either symmetric (differential) format using A, /A, B, /B, Z, /Z channels, or to asymmetric (single-ended) format using A, B, Z channels only. Acceptable input levels are RS422 (differential), TTL* (single-ended) and HTL 10–30 V.

The output format can again be selected individually for each output. The outputs provide all signals including the inverted channels, even when no inverted signals are applied to the input.

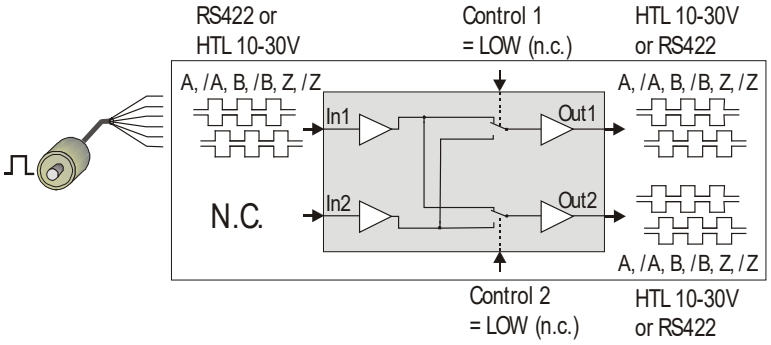
With Control input 1 = LOW (or unconnected) and Control input 2 = HIGH the signal ways are as shown in the drawing above, featuring two independent level converters.




## Encoder Splitter (Dual Output)

Input 1 is used as encoder input, and Input 2 remains unconnected. The input can be set to either symmetric (differential) format using A, /A, B, /B, Z, /Z channels, or to asymmetric (single-ended) format using A, B, Z channels only. Acceptable input levels are RS422 (differential), TTL* (single-ended) and HTL 10–30 V.

The output standard can again be selected individually for each output. The outputs provide always all signals including the inverted channels, even when no inverted signals are applied to the input. Control1 and Control2 remain unconnected with this application.



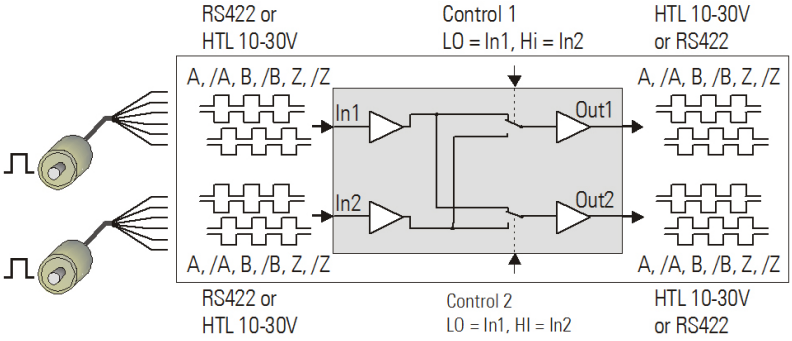

## Encoder Signal Switcher

Both inputs can be individually set to either symmetric (differential) format using A, /A, B, /B, Z, /Z channels, or to asymmetric (single-ended) format using A, B, Z channels only. Acceptable input levels are RS422 (differential), TTL* (single-ended) and HTL 10–30 V.

The output standard can again be selected individually for each output. The outputs provide always all signals including the inverted channels, even when no inverted signals are applied to the input.

Inputs Control1 and Control2 select the signal ways:

- LOW: The corresponding output is connected to input 1
- HIGH: The corresponding output is connected to input 2




** For TTL inputs (single-ended <5V), see section 3.4 of the WDG012VGOM user manual.*

# Encoder Selection Guide

## SAE Dimension Encoders & Metric Dimension Encoders

### Rotary Incremental Encoder Selection Guide

| Type | Duty | Series | Encoder Diameter | Shaft Diameter | Shaft Type | Operating Voltage (VDC) and Electrical Output | IP Rating | Cable | Max Radial Load (N) | Max Axial Load (N) | Available Resolutions (PPR) | Brand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Incremental | Modular Kit | AMT | 28mm, 42mm | 2, 3, 4, 5, 6, 8mm 3/16, 1/4, 3/8, 1/2, 5/8in | Hollow | 5V Line Driver (TTL) or 5V Push-Pull (Totem Pole) | IP20 | Custom cables sold separately | N/A | N/A | Programmable up to 4096 | Same Sky |
| | | MTRA | 31mm | 5mm 1/4in, 3/8in | Hollow | 5V Line Driver (TTL) or 5V Push-Pull (Totem Pole) | IP20 | Custom cables sold separately | N/A | N/A | 400, 1000 | SureStep |
| | Light Duty | TRD-S(H)R | 38mm, 40mm | 8mm | Solid or Hollow | 5V Line Driver (TTL) or 5–26V NPN/PNP Open Collector (HTL) | IP50 or IP65 | Integral 2m pigtail cable | 20 | 10 | 100, 200, 360, 500, 600, 1000, 1024, 2000, 2500 | JTEKT |
| | | A41 | 41mm | 1/4in | Solid or Hollow | 5–30 VDC Universal output circuit: Push-Pull (Totem Pole), or NPN/PNP Open Collector (HTL), or Line Driver (TTL) | IP64 | Integral 2m pigtail cable | 20 | 20 | 100, 200, 360, 500, 1000, 1024, 2000, 2048, 3600, 4096 | Lika |
| | Medium Duty | A50 | 50mm | 1/4, 3/8in | Hollow | | IP65 | M12 cables sold separately | 20 | 20 | 360, 1000, 1024, 2048 | |
| | | A80 | 80mm | 30mm (reducer bushings available for 19 & 20mm, 5/8, 7/8, 1, and 1 1/8in) | Hollow | | IP64 | M23 cables sold separately | 30 | 30 | 1024 | |
| | | AR01 | 58mm | 15mm | Solid Dual-shaft | | IP65 | M12 cables sold separately | 50 | 50 | 250 (linear res: 0.36 °/cts) 1250 (linear res: 0.072 °/cts) | |
| | | TRDA-20 | 2in | 3/8in | Solid | 5 VDC Line Driver (TTL) or 5–30 VDC Push-Pull (Totem Pole) | IP50 | Integral 2m pigtail cable | 50 | 30 | 100, 360, 500, 1000, 1024, 2500 | JTEKT |
| | | TRDA-25 | 2.5in flange (w/2.0" body) | 3/8in | Solid | | IP65 | Military Spec (MS) cables sold separately | 50 | 30 | 100, 360, 500, 1000, 1024, 2500 | |
| | | TRD-N(H) | 50mm | 8mm | Solid or Hollow | | IP65 | Integral 2m pigtail cable | 50 | 30 | 3, 4, 5, 10, 30, 40, 50, 60, 100, 120, 200, 240, 250, 300, 360, 400, 480, 500, 600, 750, 1000, 1024, 1200, 2000, 2500 | |
| | Heavy Duty | AQ58/59 | 58mm, 59mm | 3/8in solid, 15mm hollow (reducer bushings available for 6, 8, 10, 11, 12mm; 1/4, 3/8, 1/2in) | Solid or Hollow | 5–30 VDC Universal output circuit: Push-Pull (Totem Pole), or NPN/PNP Open Collector (HTL), or Line Driver (TTL) | IP65 | M12 cables sold separately | 100 | 100 | Programmable from 1 to 16384 (default 1024) | Lika |
| | | WDGI 36J | 36mm | 10mm | Solid | 4.75–30 VDC Universal (HTL or TTL, single-ended or differential) | IP69K | 8-pin M12 A-coded cable | 300 | 300 | 60, 100, 360, 500, 1000, 1024, 2000, 2500, 4096, 5000 | Wachendorff |
| | | WDGI 58A | 58mm | 6mm | Solid | 5–30 VDC HTL, inv. (TTL/ RS422 comp. at 5 VDC) | IP65/ IP67 | 8-pin M12 A-coded cable | 125 | 120 | 60, 100, 360, 500, 1000, 1024, 2000, 2500, 4096, 5000 | |
| | | WDGI 58B | 58mm | 10mm | Solid | 5–30 VDC HTL, inv. (TTL/ RS422 comp. at 5 VDC) | IP65/ IP67 | 8-pin M12 A-coded cable | 220 | 120 | 60, 100, 360, 500, 1000, 1024, 2000, 2500, 4096, 5000 | |
| | | WDGI 58H | 58mm | 12mm or 15mm (reducer bushings available for 6, 7, 8, 10mm; 1/4, 3/8, 1/2in) | Hollow | R05: 4.75–5.5 VDC R05: TTL, RS422 comp., inverted | IP65 | 8-pin M12 A-coded cable | 80 | 60 | 4096, 5000 | |
| | | | | | | R24: 10–30 VDC HTL inverted | | | | | 2500, 4096, 5000 | |
| | | | | | | R30: 5–30 VDC HTL, inv. (TTL/RS422 comp. at 5 VDC) | | | | | 60, 100, 360, 500, 1000, 1024, 2000 | |
| | | WDG 58V | 58mm | 10mm | Solid | 5–30 VDC universal (HTL or TTL, single-ended or differential) or 4.75–5.5 VDC Line Driver (Differential) or 10–30 VDC Push-Pull (Totem Pole) | IP69K | Integral 5m pigtail | 100 | 100 | 60, 100, 360, 500, 1000, 1024, 2000, 2500, 4096, 5000 | |

# Encoder Selection Guide

## SAE Dimension Encoders & Metric Dimension Encoders

### Rotary Incremental Encoder Selection Guide *(continued)*

| Type | Duty | Series | Encoder Diameter | Shaft Diameter | Shaft Type | Operating Voltage (VDC) and Electrical Output | IP Rating | Cable | Max Radial Load (N) | Max Axial Load (N) | Available Resolutions (PPR) | Brand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Incremental | Heavy Duty | TRD-GK | 78mm | 10mm | Solid | 10–30 VDC Push-Pull (Totem Pole) | IP65 | Integral 2m pigtail cable | 100 | 50 | 30, 100, 120, 200, 240, 250, 300, 360, 400, 500, 600, 1000, 1200, 2000, 2500, 3600, 5000 | JTEKT |

### Rotary Absolute Encoder Selection Guide

| Type | Duty | Series | Encoder Diameter | Shaft Diameter | Shaft Type | Operating Voltage (VDC) and Electrical Output | IP Rating | Cable | Max Radial Load (N) | Max Axial Load (N) | Available Resolutions (PPR) | Brand |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Absolute | Medium Duty | TRD-NA | 50mm | 8mm | Solid | 10–30 VDC NPN/PNP Open Collector (HTL) | IP65 | Integral 2m pigtail cable | 50 | 30 | 32, 64, 128, 180, 256, 360, 512, 720, 1024 (Gray code) | JTEKT |
| | | AM58/59[1] | 58mm | 3/8in solid, 15mm hollow (reducer bushings available for 6, 8, 10, 11, 12mm; 1/4, 3/8, 1/2in) | Solid or Hollow | 5-30 or 10-30VDC Input, Ethernet/Serial Comms Output | IP65 | M12 cables sold separately | 40 | 40 | Programmable up to 8192 PPR (13 bit), up to 16384 turns (14 bit) | Lika |

**1 - AM58/59 encoders have different versions supporting 4 different outputs - EtherNet/IP, Modbus TCP, EtherCAT, and Modbus RTU (RS485).**

### Linear Encoder Selection Guide

| Type | Duty | Sensing Technology | Series | Available Lengths | Tracking Width | Operating Voltage (VDC) and Electrical Output | IP Rating | Cable | Max Speed | Available Resolutions | Brand |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rotary Encoder + Wheel | Medium Duty | Optical | AR01 | Unlimited | 88mm (two wheels) | 5–30 VDC Universal output circuit: Push-Pull (Totem Pole), or NPN/PNP Open Collector (HTL), or Line Driver (TTL) | IP65 | M12 cables sold separately | With 12.5in wheels: 34 ft/s<br>With 250mm wheels: 8.3 m/s | 250 PPR (linear res: 0.36 deg/cts)<br>1250 PPR (linear res: 0.072 deg/cts) | Lika |
| Linear Encoder + Tape (non-contact) | Medium Duty | Magnetic | AME95 | 0.25 to 20m (tape can be cut in field) | 10mm tape | 5 VDC Line Driver (Differential) or 10–30 VDC Push-Pull (Totem Pole) | IP67 | 2m pigtail or 2m 8-pin M12 male A-coded | 20 m/s | 10µm (x4 quadrature= 2.5µm/ct) | |
| Linear Encoder + Rail (captured) | Heavy Duty | Magnetic | AMIG | Fixed lengths: 195, 220, 240, 300, 370, or 650mm | 25mm rail | | IP65 | | 1 m/s | 50µm (x4 quadrature= 12.5µm/ct) | |