Datum Electronics 425 Series outputs guidance Technical Note

1. Datum Link Wi-Fi application

Datum Link is a professional application designed for the live monitoring, logging, and exportation of data read from Datum Electronics torque transducers. **Datum Link** is compatible with all sensors in the **425 Series**. This application replaces the Datum Connect app.

Download & Installation

Datum Link is free of charge and available for download from the App Store for iPhone and iPad, as well as on Google Play for Android Devices, and the Microsoft Store for Windows 11 PCs.

Permissions

Datum Link requires the following permissions:

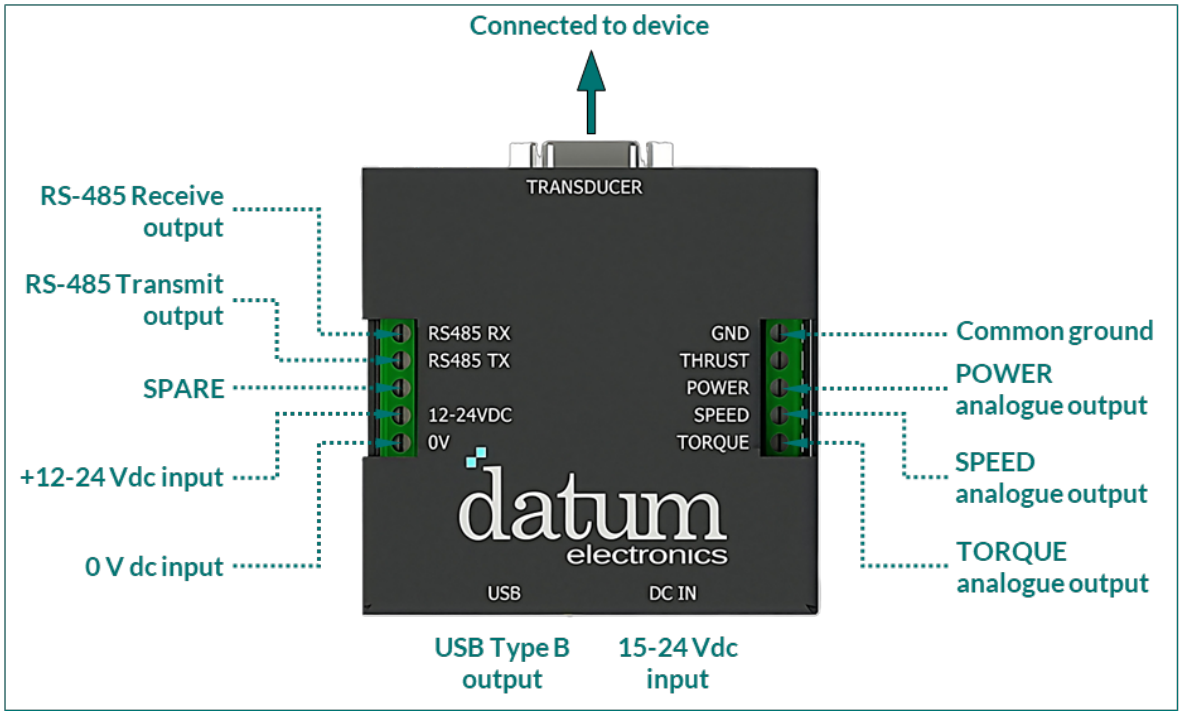
- Location Services – Optional for geolocation logging
- Network Access – Required for Wi-Fi device communication
- Storage – Required for log file management
- USB-Serial – Required for serial device communication (Windows only)

Support

If you require assistance, our team are happy to help and can be reached by submitting a support ticket at datum-electronics.com/support/ or by calling us on +44 (0) 1983 282834.

2. Datum Connect Interface (DCI) outputs

Other outputs are accessible through the Datum Connect Interface (DCI) hardware.



3. Analogue outputs

The DCI has the following calibrated analogue output options available [default 100 SPS].

Three configurable analogue outputs for Torque, Speed*, and Power.

Unipolar	**Bipolar**
4-20 mA	4-12-20 mA
0-5 Vdc	+/-5 Vdc
0-10 Vdc	+/-10 Vdc

These are selectable using the **Datum Link** application.

The full-scale values for these will have been set to either requested levels at order placement or to the transducer's maximum specifications as shown on the torque sensor data sheet.

e.g. **M425 S1–100Nm**

- Maximum Torque = 100 N·m
- Maximum Speed = 10,000 RPM
- Maximum Power = 105 kW

If you need the maximum full scale values adjusting please contact Datum Electronics support team: support@datum-electronics.co.uk

* Note: Speed is unipolar only

4. RS-485 output – standard

Please see below string output information if you wish to connect via RS-485 and create your own software application.

Serial output: RS-485

Output baud rate	3 MBaud #
Data bits	8
Parity	None
Stop bits	1

The data is transmitted, as readable ASCII, in the format

$ZR,+T.TTTT,R.RR,*CS\n

Where;			Note:
$ZR	=	start of line character	(string identifier)
+T.TTTT	=	raw data from sensor (mV/V)	(signed only when negative)
R.RR	=	shaft rotation in RPM	(Max. 5 digits left of decimal; no leading 0s)
*CS	=	checksum	(CheckSum8 Modulo 256)
\n	=	new line	(end of line)

The torque can be calculated by dividing the mV/V calibration figure (e.g. 1.652) and multiplying by the calibration range value (e.g. 100 N·m).

Example

$ZR,0.1234,56.78,*58

Torque = (0.1234 ÷ 1.652) × 100 = 64.02 N·m

Baud rate can be configured

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5. RS-485 output (legacy)

Please see below string output information if you wish to connect via RS-485 and create your own software application.

Serial output: RS-485

Output baud rate	3 MBaud #
Data bits	8
Parity	None
Stop bits	1

Data is transmitted as a 6 byte frame

Bit 7 (MSB) of each byte is used to synchronise the frame, with the first byte having bit 7 set (=1) and all other bytes having byte 7 cleared (=0).

;Byte1	1xxxxxxx bit 7	= start,	0-6	= MSB Torque data (signed)
;Byte2	0xxxxxxx bit 7	= 0,	0-6	= NMSB Torque data (signed)
;Byte3	0xxxxxxx bit 7	= 0,	0-6	= LSB Torque data (signed)
;Byte4	0xxxxxxx bit 7	= 0,	0-6	= MSB Speed data (unsigned)
;Byte5	0xxxxxxx bit 7	= 0,	0-6	= LSB Speed data (unsigned)
;Byte6	0xxxxxxx bit 7	= 0,	0-6	= Supply Voltage (unsigned)

The first 3 bytes contain torque data, transmitted as a representation of mV/V as measured from the strain sensing element.

The 7 bits of data from each byte are stacked (Byte1 = MSD) to a form a 21-bit two's complement signed number which equates to mV/V × 10,000.

e.g.

00000000000000000000 = 0.0 mV/V

00000000000000000001 = +0.0001 mV/V

11111111111111111111 = -0.0001 mV/V

Bytes 4 and 5 contain 14 bits of speed data in RPM.

The 7 bits of data from each byte are stacked (Byte4 = MSD) to form a 4-bit number which equates to integer RPM. (If not used, it will be set to zero).

Byte 6 contains a 7 bit representation of on-shaft supply voltage scaled as Vx10. This rolls over from 127 0 at 12.8 V. (If not used, the number is indeterminate).

Baud rate can be configured

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The mV/V torque value can be calculated as follows (numbers are decimals).

1. Acquire and store the first 3 bytes of data.
2. Subtract 128 from the first byte to the remove the frame start ident bit.
3. Calculate (Byte1 × 16 384) + (Byte2 × 128) + Byte 3
4. If the result is > 1 048 576, subtract it from 0 (makes the data bipolar for the ± torque).
5. Divide by 10 000 to get mV/V
6. The torque can be calculated by dividing the mV/V calibration figure (e.g. 1.652) and multiplying by the calibration range value (e.g. 100 N·m).

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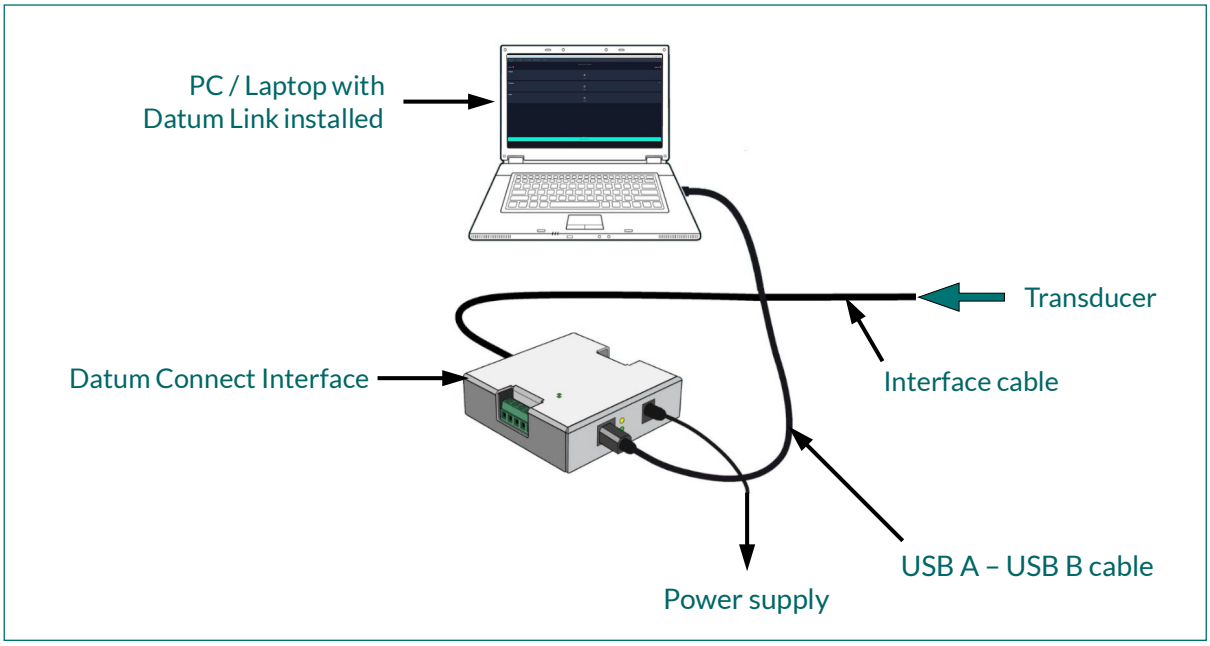
6. USB output

Datum Electronics provide software which can be used via the USB output on the DCI and a PC / laptop. **Datum Link** is free of charge and available for download from the Microsoft Store for Windows 11 PCs.



For further details see [Datum Link Torque Monitoring Software | Datum Electronics]

Please refer to the instructions supplied with your torque sensor on the USB flash drive or Datum Electronics support team: support@datum-electronics.co.uk