



Machine Tool Digital Readout Systems



M-DRO: Accuracy and Efficiency at the Touch of a Button

M-DRO is a premier brand of digital readout equipment supported by many years of experience. M-DRO supplies and installs digital readouts in engineering workshops, tool rooms, fabrication and machine shops both large and small, as well as within colleges and universities nationwide. With an extensive range of products, you can find a cost-effective solution without compromising our commitment to quality and reliability.

Since 2003 we have been dedicated to designing and developing measurement systems. Our in-house engineering team has extensive experience in product design and development. At our Hoddesdon headquarters, we have fully equipped facilities including an engineering workshop, measurement inspection area, electronic assembly, and advanced test equipment.

Installing an M-DRO digital readout to any machine will transform operation and accuracy; raising productivity of manual machine tools, significantly increasing quality and reducing wastage and overall job costs. With a varied range of dedicated DRO packages, universal kits

and bespoke systems, M-DRO has helped many businesses elevate their performance to the next level.

M-DRO has developed a range of adaptor cables and interfaces designed to allow simple replacement of damaged or faulty existing equipment from most DRO manufacturers. Most adaptors plug directly in line with no modifications to the existing equipment, keeping both the console and encoders standard. This makes it easy to upgrade to M-DRO equipment should another part need replacing in the future.

The M-DRO range of magnetic linear encoders is diverse, with models available in 25µm, 5µm, or 1µm resolutions. These encoders feature a fully-sealed and robust design with an IP67 rating, making them highly resistant to cutting oil and contamination. Our compact profile sizes are perfect for mounting in restricted spaces on smaller machine tools or on the lathe cross slide. Alternatively, our heavy-duty profiles are ideal for long-length encoders, serving as a single option for on-site installation.





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MDC720 Display Console

- Easy-to-read filtered LED display with adjustable brightness settings, providing a wide viewing angle in a variety of ambient lighting conditions
- Features both mill and lathe function on the same console, offering a standard format console within the workshop
- Housed in a robust die-cast housing, with a number of mounting arm options. A dedicated panel mount version is also available
- An ideal replacement or upgrade of existing DRO equipment with adaptor cables available to suit most brands

> MDC720 Display Consoles



	DRO-MDC720-2X	DRO-MDC720-3X	DRO-MDC720-3XP
Display Type	LED		
Case Material	Die Cast Aluminium		Aluminium
Mounting Type	External Mounting Arm		Panel
Number of Axis	2	3	3
Encoder Sign	5 Volt TTL Quadrature		
Encoder Type	Linear and Rotary (Angle)		
Input Voltage	100 ~240V AC		5v*

* External PSU included





MDC720 Display Consoles

MDC720 Functions

Basic Functions			
	Inch/mm conversion		Absolute and Incremental zero. ABS main work piece datum, INC will be relative to last position
	Zero required axis or select axis and enter an offset value		199 Zero datum coordinates can be stored and recalled during batch or repeat operations
	Calculator with the option to transfer results to axis display		Locate the centre of a work piece

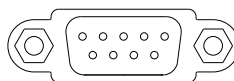
Mill Functions		Lathe Functions	
	Oblique line of holes, user define length and angle		Radius mode displays physical travel of cutting tool and diameter with display workpiece diameter
	Pitch circle diameter (PCD)		Measure a taper angle using a DTI or dial gauge to reference two points and the console will calculate recalled angle
	Simple arc		Tool offset library allows 200 tools to be stored and recalled during batch or repeat operations
	Bevel function		Axis summing, toggle between independent or combined carriage and compound travel*

*3 axis model only

MDC720 Encoder Input

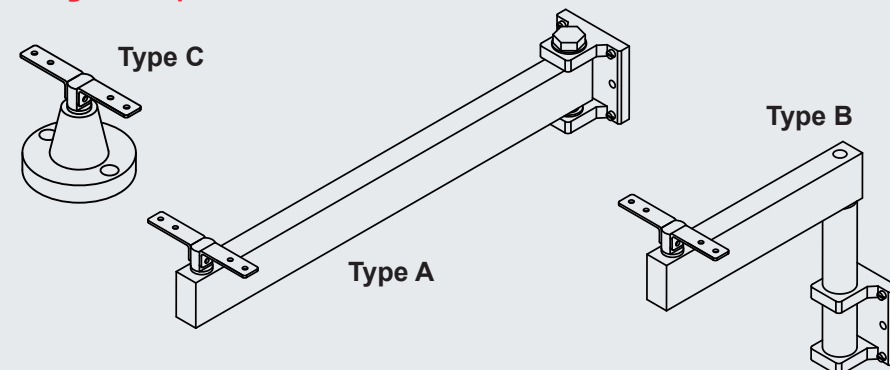
9 way D type encoder connections

Resolution options: 0.1µm, 0.25µm, 0.5µm, 1µm, 2.5µm, 5µm, 10µm, 25µm, 50µm and 100µm



Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
-	0v	-	Screen	-	A	+5v	B	Z

Mounting Arm Options



Dimensions



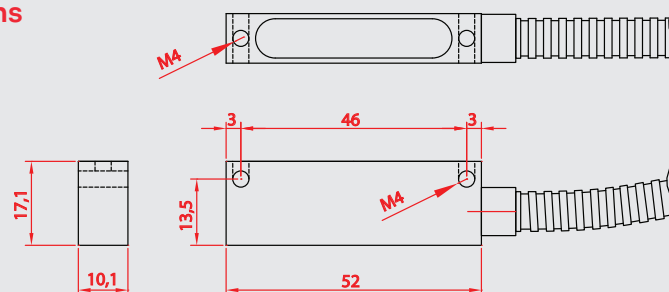
Panel cut out 250mm x 140mm

EH-05 Series Encoders

- Fully sealed to IP67 – coolant proof and suitable for harsh workshop conditions
- Compact, suitable for all sizes of machines. Ideal for lathe cross slides & limited space installation
- Cut-to-length encoder creates maximum flexibility during installation
- Available in a range of reading lengths, please contact us for machine travels over 3 metres
- Long-length encoder support profiles are supplied in cut lengths that can either butt or join
- Non-contact system which allows for a more robust and shock-resistant install

➤ Reading Head

Reading Head Dimensions



Specifications

	DRO-MG-EH-05	DRO-MG-EH-01	DRO-MG-EH-25	DRO-MG-EH-05-DIFF	DRO-MG-EH-01-DIFF
Encoder Type	Magnetic				
Resolution (µm)	5	1	25	5	1
Output Signal	5 Volt TTL Quadrature			RS422 Differential Quadrature	
Cable Length (m)*	3.5		3	3.5	
Cable & Connector Type	Metal armoured cable with 9 pin D type male				
Z Reference	Yes		No	Yes	
Protection Class	IP67				

* extension cables available





EH-05 Series Magnetic Encoder Support Profiles

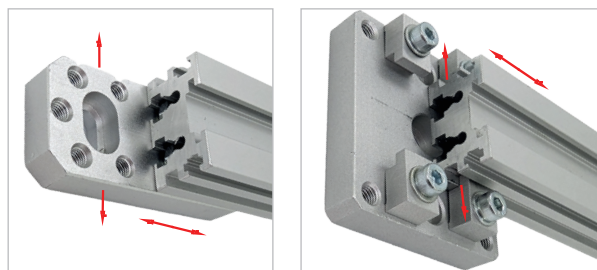
Standard Profile AP-25

A compact support profile ideal for installation on machined surfaces. Through hole fixing using M4 large pan head bolts that allow for adjustment.



Heavy Duty Profile AP-30

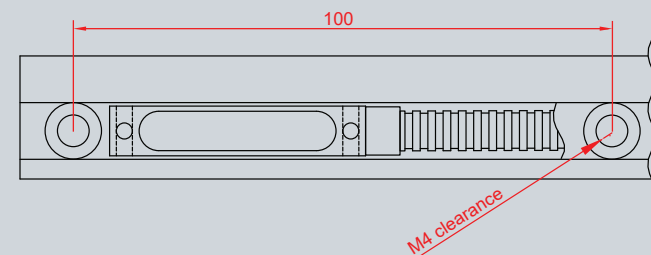
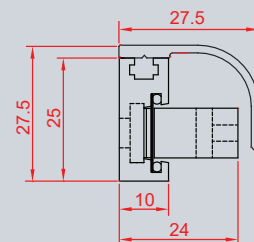
A larger support profile ideal for mounting on non-machined surfaces and can bridge up to 750mm without requiring additional support. Supplied with bolt-on end blocks with fixing slots and jacking screws for easy adjustment. The joining plate has jacking screws for adjustment level and features two independent sets of clamps to allow for alignment of the two support profile sections.



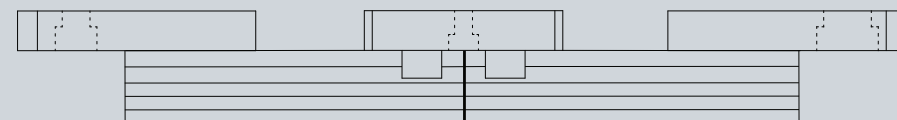
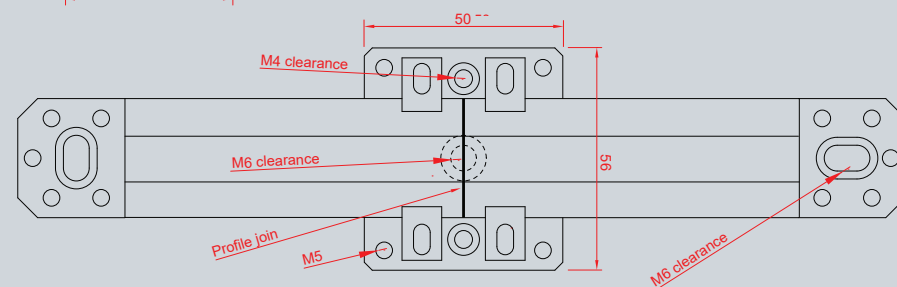
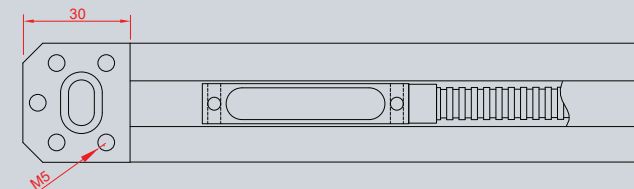
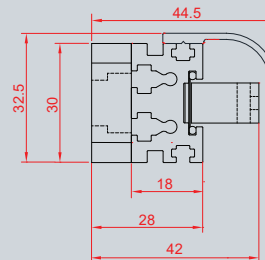
Encoder Travel	AP-25 Part Number	AP-30 Part Number	Encoder Travel	AP-25 Part Number	AP-30 Part Number
150	DRO-MG-KT-200	-	1650	DRO-MG-KT-1700	DRO-MG-KT-30-1700
250	DRO-MG-KT-300	-	1750	DRO-MG-KT-1800	DRO-MG-KT-30-1800
350	DRO-MG-KT-400	DRO-MG-KT-30-400	1850	DRO-MG-KT-1900	DRO-MG-KT-30-1900
450	DRO-MG-KT-500	DRO-MG-KT-30-500	1950	DRO-MG-KT-2000	DRO-MG-KT-30-2000
550	DRO-MG-KT-600	DRO-MG-KT-30-600	2050	DRO-MG-KT-2100	DRO-MG-KT-30-2100
650	DRO-MG-KT-700	DRO-MG-KT-30-700	2150	DRO-MG-KT-2200	DRO-MG-KT-30-2200
750	DRO-MG-KT-800	DRO-MG-KT-30-800	2250	DRO-MG-KT-2300	DRO-MG-KT-30-2300
850	DRO-MG-KT-900	DRO-MG-KT-30-900	2350	DRO-MG-KT-2400	DRO-MG-KT-30-2400
950	DRO-MG-KT-1000	DRO-MG-KT-30-1000	2450	DRO-MG-KT-2500	DRO-MG-KT-30-2500
1050	DRO-MG-KT-1100	DRO-MG-KT-30-1100	2550	DRO-MG-KT-2600	DRO-MG-KT-30-2600
1150	DRO-MG-KT-1200	DRO-MG-KT-30-1200	2650	DRO-MG-KT-2700	DRO-MG-KT-30-2700
1250	DRO-MG-KT-1300	DRO-MG-KT-30-1300	2750	DRO-MG-KT-2800	DRO-MG-KT-30-2800
1350	DRO-MG-KT-1400	DRO-MG-KT-30-1400	2850	DRO-MG-KT-2900	DRO-MG-KT-30-2900
1450	DRO-MG-KT-1500	DRO-MG-KT-30-1500	2950	DRO-MG-KT-3000	DRO-MG-KT-30-3000
1550	DRO-MG-KT-1600	DRO-MG-KT-30-1600	3050	DRO-MG-KT-3100	DRO-MG-KT-30-3100

Profile Dimensions

AP-25 Standard Profile



AP-30 Heavy Duty Profile



All dimensions in mm

Dedicated Mill DRO Kits

- Save time during installation with M-DRO pre-designed, dedicated kits
- UK-written user manual with full colour, step-by-step install guides
- Encoders can be cut to length to accommodate machine variants
- Compact magnetic encoders sealed to IP67, making them coolant proof
- User-friendly MDC720 display consoles with dedicated milling functions including PCD, line of holes, arc contouring and incline milling

> Dedicated Kit Selection

Choosing the Correct Dedicated Kit

All the dedicated kits have been designed and fitted to the standard machines. Please check the axis travel and match it against the kit travel. The magnetic encoders can be cut to length if the encoder is too long. If longer encoders are required, please contact us.

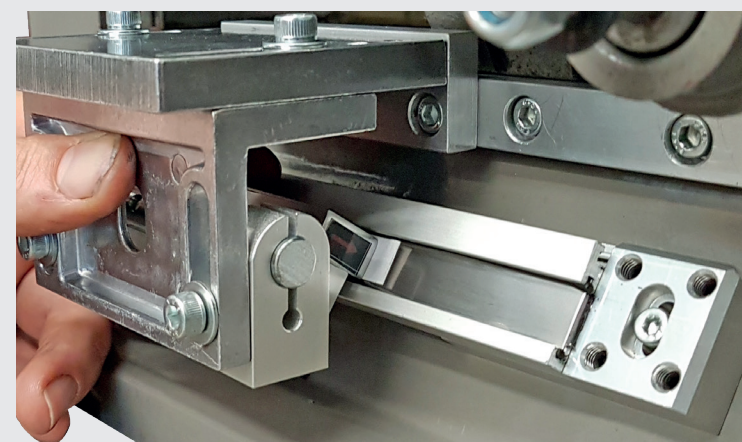
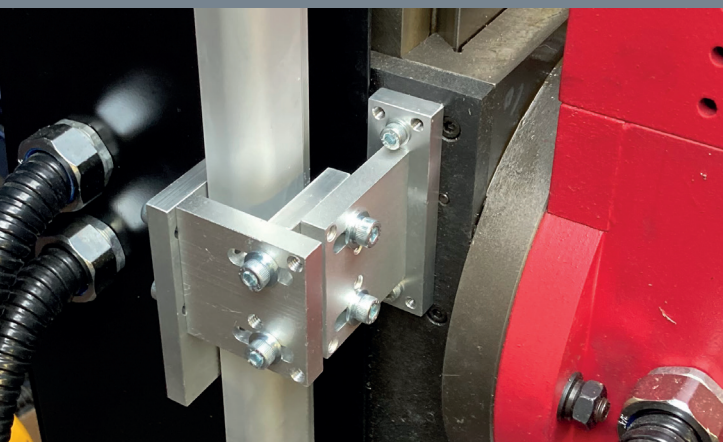
Please be aware that "clone" machines may have slight variations and require a modification during the installation. For example the original Bridgeport has 3 pre-drilled holes along the right hand side of the knee. The kit includes a plate and bolts to use these existing thread holes, these may not be present on a clone machine.

Fitting Instructions Included

All the dedicated kits are supplied with a colour install guide. Please contact us for a copy prior to purchase.

Allow for Future Upgrade

A two axis kit can have the console upgraded to a 3 axis model, this allows for the addition of the 3rd axis at a later date without the need to replace the console.





Dedicated DRO Kits for Milling Machines

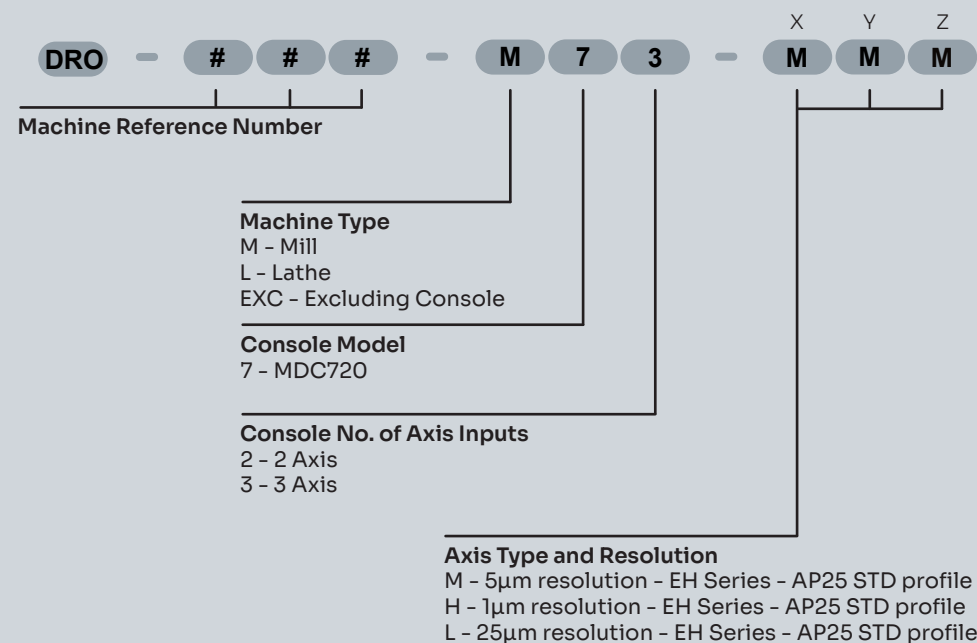
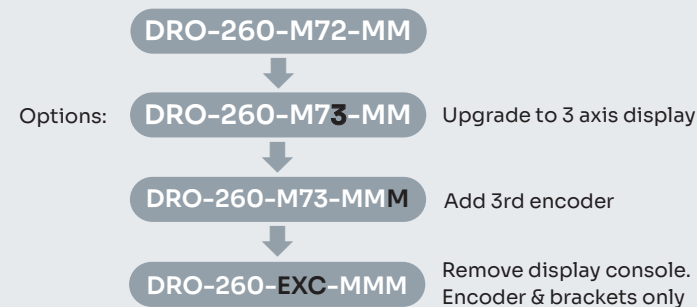
All dimensions in mm

	Mill Make and Model	No. Axis	Kit Encoder Travel*		
			X Axis	Y Axis	Z Axis
DRO-030-M72-MM	Chester Champion 16V	2	450	250	-
DRO-030-M73-MMM		3			350
DRO-100-M72-MM	Chester Champion 20V	2	650	250	-
DRO-100-M73-MMM		3			350
DRO-120-M72-MM	Chester Eagle 25 Mill/Drill	2	450	250	-
DRO-130-M72-MM	Chester Eagle 30 Mill/Drill	2	550	250	-
DRO-140-M72-MM	Chester Lux	2	650	250	-
DRO-160-M72-MM	Chester 626	2	450	250	-
DRO-260-M72-MM	Bridgeport 42"	2	750	350	-
DRO-260-M73-MMM		3			450
DRO-262-M72-MM	Bridgeport 36"	2	650	350	-
DRO-262-M73-MMM		3			450
DRO-265-M72-MM	wBridgeport 48"	2	950	350	-
DRO-265-M73-MMM		3			450
DRO-390-M73-MMM	XYZ 1500 Turret Mill	3	830	450	500
DRO-400-M73-MMM	XYZ 2000 Turret Mill (Panel)	3	850	450	500
DRO-410-M73-MMM	XYZ SLV Turret Mill (Panel)	3	1050	450	500
DRO-460-M72-MM	Sieg SX3	2	450	185	-
DRO-460-M73-MMM		3			500
DRO-470-M72-MM	Sieg SX2.7	2	450	185	-
DRO-470-M73-MMM		3			350
DRO-475-M72-MM	Sieg SX2.7(L)	2	550	185	-
DRO-475-M73-MMM		3			350
DRO-480-M72-MM	Sieg SX3.5ZP	2	550	250	-
DRO-480-M73-MMM		3			500

* encoders can be cut to length if required

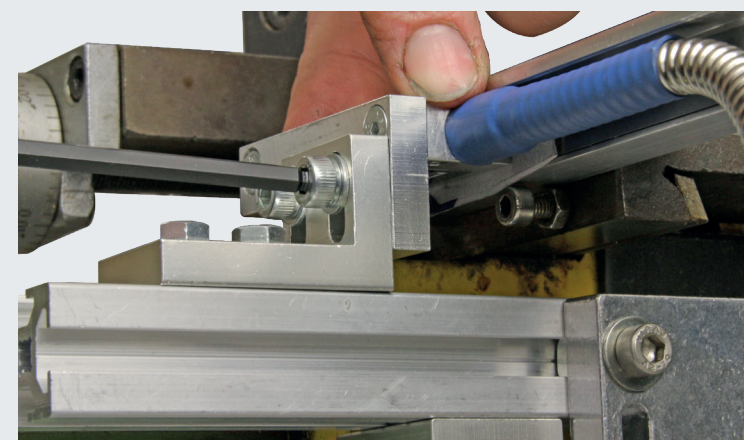
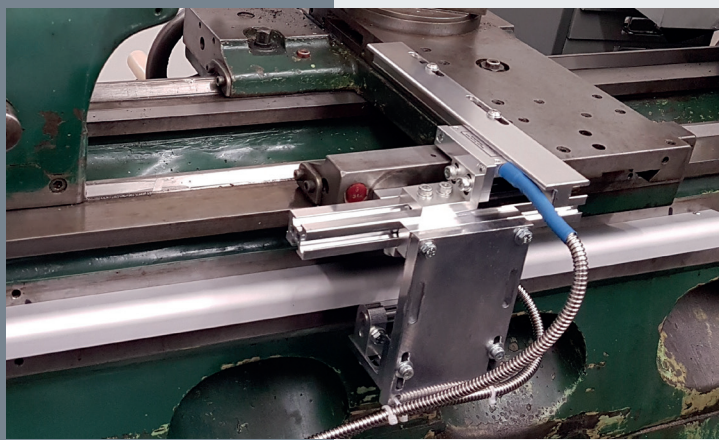
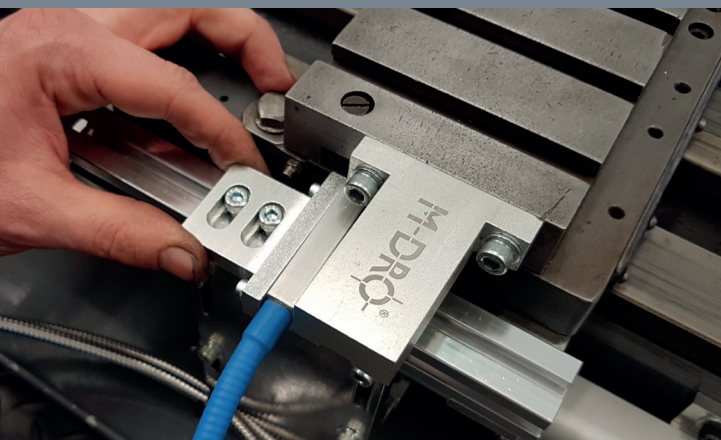
Part Number Options

Standard 2 axis part number for Bridgeport DRO kit including 2 axis display, two encoders and dedicated bracket kit:



Dedicated Lathe DRO Kits

- Save time during installation with these pre-designed, dedicated kits
- UK-written user manual with full colour, step-by-step install guides
- Encoders can be cut to length to accommodate machine variants
- Compact magnetic encoders, ideal for the lathe cross slide
- Fully sealed to IP67 making them coolant proof and ideal for the harsh working environment
- User friendly MDC720 display consoles with dedicated lathe functions including radius or diameter display, tool offsets and taper measure



> Dedicated Kit Selection

Choosing the Correct Dedicated Kit

All the dedicated kits have been designed and fitted to the standard machines. Please check the axis travel and match against the kit travel. The magnetic encoders can be cut to length if the encoder is too long. If longer encoders are required please contact us.

Please be aware that some lathe accessories may need to be removed for example taper turning attachments or copier units.

Fitting Instructions Included

All the dedicated kits are supplied with a colour install guide. Please contact us for a copy prior to purchase.

Embedded Cross Slide Option

Some kits have the option of an embedded cross slide; this requires the cross slide to be removed, the extension block supplied to be fitted and a slot to locate the magnetic tape to be machined along the underside. This option can often provide less restriction around the cross slide and tailstock.



Dedicated DRO Kits for Lathes

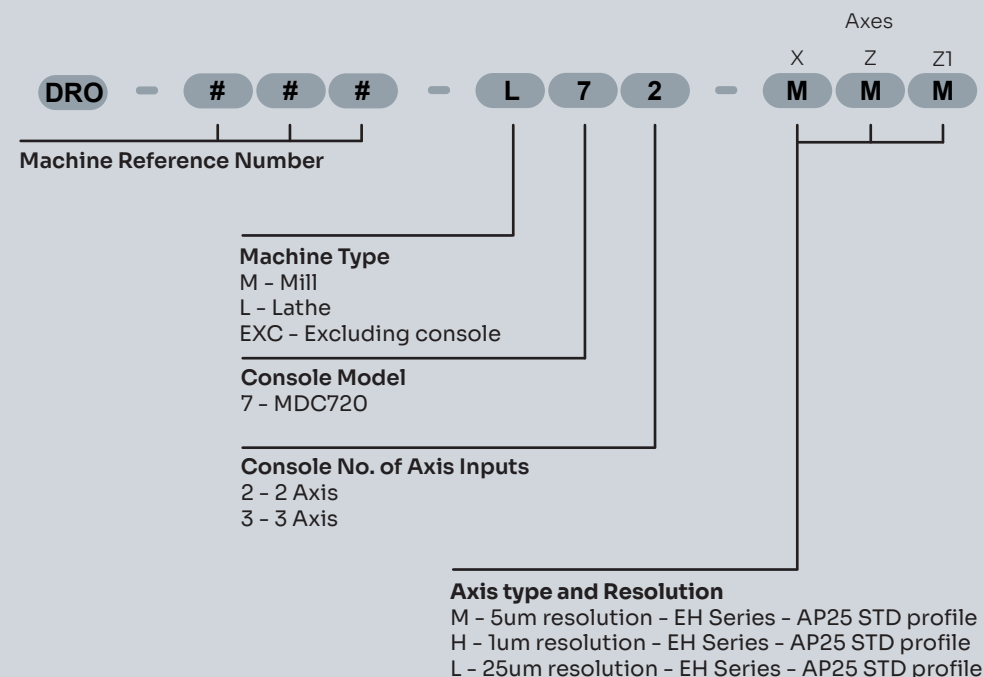
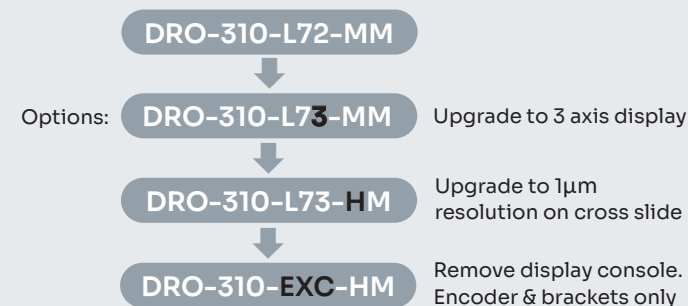
All dimensions in mm unless otherwise specified

	Lathe Make and Model	Between Centres	Kit Encoder Travel*	
			X Axis	Z Axis
DRO-010-L72-MM	Myford ML7(S) Bolt-on	20"	210	550
DRO-015-L72-MM		31"		850
DRO-012-L72-MM	Myford ML7(S) Embedded	20"		550
DRO-017-L72-MM		31"		850
DRO-040-L72-MM	Chester DB7VS	300	140	350
DRO-051-L72-MM	Chester DB10 Super MKII	500	130	550
DRO-056-L72-MM		750		850
DRO-060-L72-MM	Chester DB8VS	400	120	450
DRO-220-L72-MM	Chester Centurion	500	250	550
DRO-225-L72-MM		800		850
DRO-250-L72-MM	Myford 254	21"	185	650
DRO-010-L72-MM	Myford 254 Embedded			
DRO-270-L72-MM	Colchester Chipmaster	20"	210	550
DRO-290-L72-MM	Colchester Bantam	20"	210	550
DRO-390-L72-MM		30"		850
DRO-300-L72-MM	Boxford AUD, BUD & CUD (standard cross slide fitting)	20"	210	550
DRO-305-L72-MM		42"		1050
DRO-302-L72-MM	Boxford AUD, BUD & CUD (embedded cross slide)	20"		550
DRO-307-L72-MM		42"		1050
DRO-310-L72-MM	Colchester Triumph 2000	30"	250	850
DRO-315-L72-MM		50"		1450
DRO-360-L72-MM	XYZ 1550	1250	470	1350
DRO-370-L72-MM	XYZ 1330	750	320	800
DRO-380-L72-MM	XYZ 1530	750	320	800

* encoders can be cut to length if required

Part Number Options

Standard 2 axis part number for Colchester Triumph DRO kit including 2 axis display, two encoders and dedicated bracket kit:



Universal DRO Kits

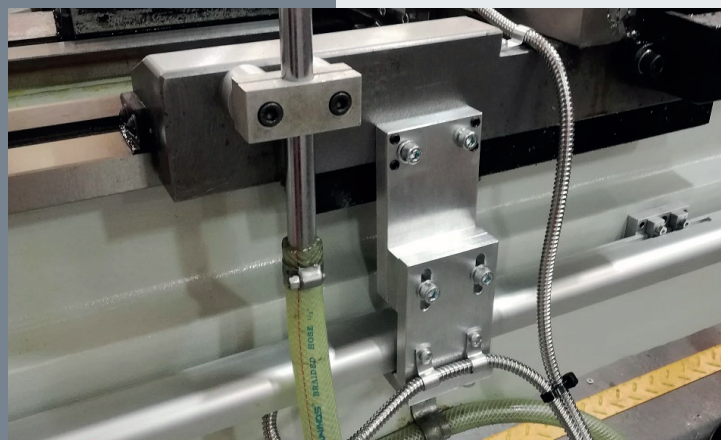
- Universal digital readout packages suitable for a wide range of milling machines or lathes when a dedicated kit is not available
- EH series magnetic encoders, compact and sealed to IP67
- Wide range of encoder travel lengths available up to 15 metres
- Cut-to-length encoders
- Universal aluminium bracket system which can easily be adapted

> Universal DRO Kits



Universal Bracket System

The M-DRO universal bracket system uses a unique extrusion system that has two 5mm through holes. Simply cut the plate to length and tap the ends M6. This allows the plates to be customised to suit the install, offering numerous combinations of "L", "U" brackets or spacer pieces that bolt together rigidly.



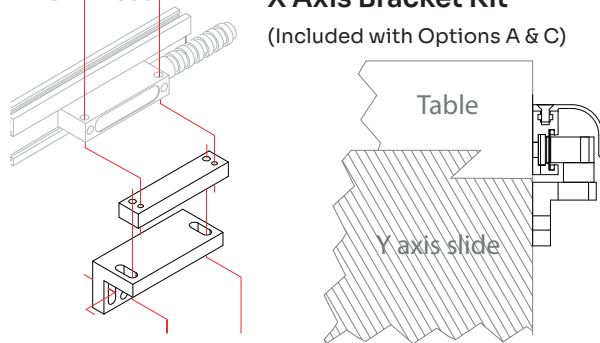


Universal Mill DRO Kits

DRO-BR-506

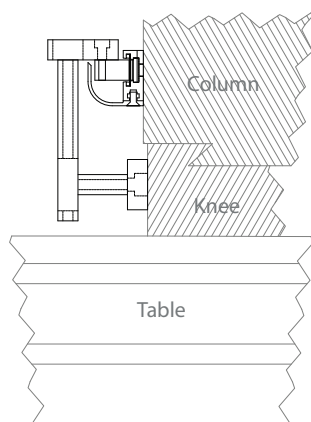
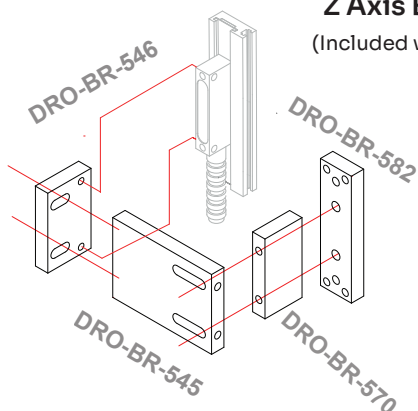
X Axis Bracket Kit

(Included with Options A & C)



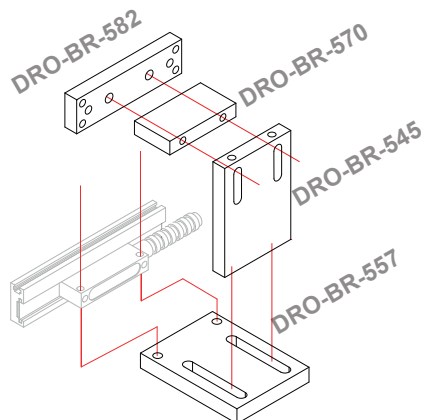
Z Axis Bracket Kit

(Included with Option C)

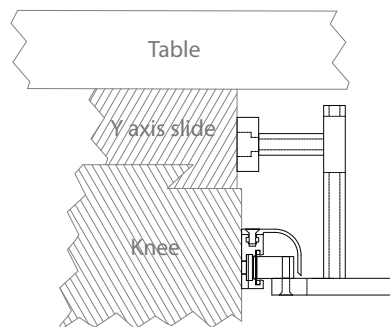


Y Axis Bracket Kit

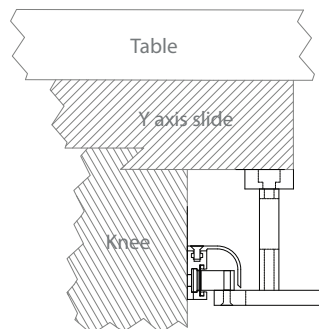
(Included with Options A & C)



Mounting Option 1:



Mounting Option 2:



Kit Selection

1. Select your base mill package excluding magnetic rails
2. Choose your magnetic rails based on slideway travel. Select the nearest encoder travel (adding a minimum extra 10mm) from page 7.* X = 740mm, Y = 320 & Z = 420mm travels

* encoders can be cut to length if required

Example 1: 2 axis kit including 2 x 5µm encoders

DRO-M22AA-MM

+

DRO-MG-KT-800

+

DRO-MG-KT-400

Example 2: 3 axis kit including 3 x 5µm encoders

DRO-M23CA-MMM

+

DRO-MG-KT-800

+

DRO-MG-KT-400

+

DRO-MG-KT-500

DRO - M 2 2 A A - X Y Z Axis (optional)
M M M

Machine Type

M - Mill
L - Lathe

Console Model

2 - MDC720

No. of Axis on Console

2 - 2 Axis
3 - 3 Axis

Bracket Kit

A - Mill Pack Option A
C - Mill Pack Option C

Encoder Head Resolution

M - 5µm resolution - EH Series
H - 1µm resolution - EH Series
L - 25µm resolution - EH Series

Console Mounting Hardware

A - Straight arm for machine or wall mounting
B - Offset arm for lathe headstock
C - Boss mount for lathe headstock

Universal Bracket Kit Options

Option A

DRO-BR-506
DRO-BR-582
DRO-BR-570
DRO-BR-545
DRO-BR-557

Option C

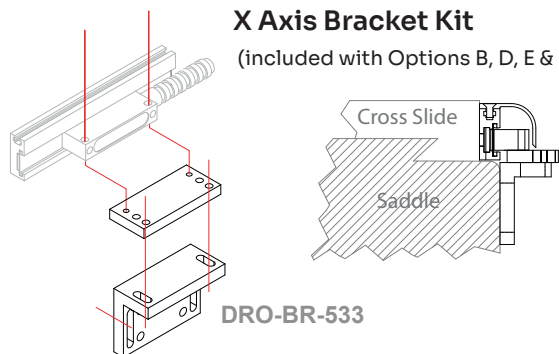
(Option A) &:
DRO-BR-582
DRO-BR-570
DRO-BR-545
DRO-BR-546



Universal Lathe DRO Kits

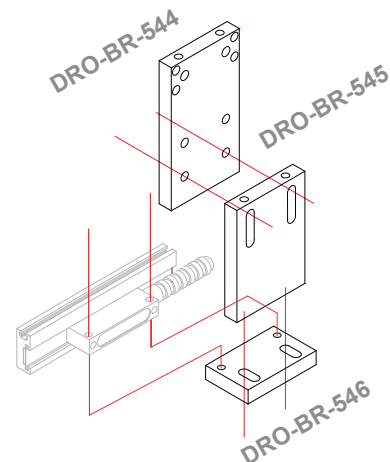
X Axis Bracket Kit

(Included with Options B, D, E & F)



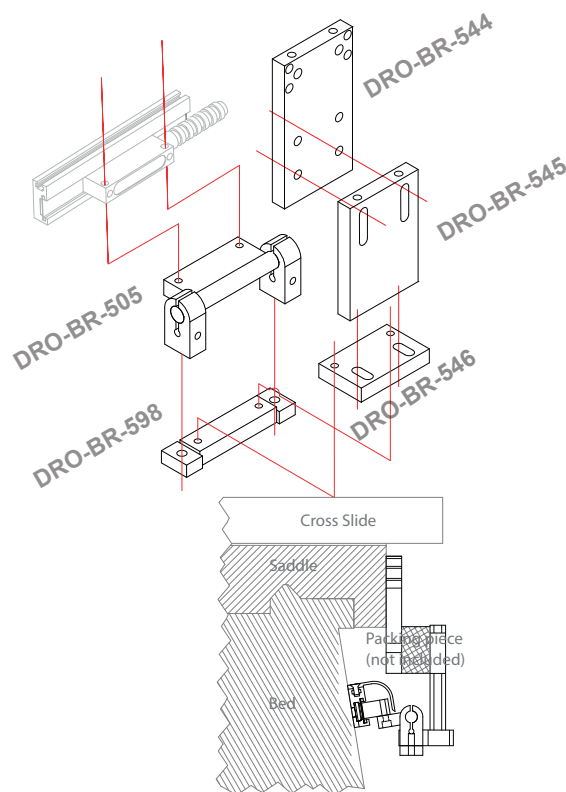
Z Axis Square Bed Bracket Kit

(Included with Options B & D)

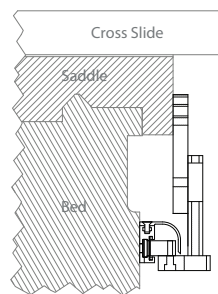


Z Axis Angled Bed Bracket Kit

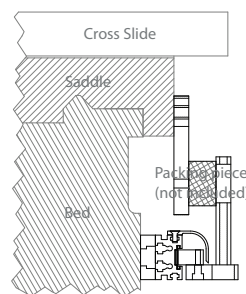
(Included with Options E & F)



Mounting Configuration 1:



Mounting Configuration 2:



Kit Selection

1. Select your base lathe package including 2 x 5µm encoders excluding magnetic rails
2. Choose your magnetic rails based on slideway travel. Select the nearest encoder travel (adding a minimum of 10mm extra) from page 7.* X = 240mm, Z = 860mm travels

* encoders can be cut to length if required

Example 1: 2 axis kit

DRO-L22BB-MM

+

DRO-MG-KT-300

+

DRO-MG-KT-1000

Example 2: 2 axis kit cross slide upgrade to 1µm

DRO-L22BB-HM

+

DRO-MG-KT-300

+

DRO-MG-KT-1000

DRO - L 2 2 B B - M M M X Z Z1 Axis (optional)

Machine Type

M - Mill
L - Lathe

Console Model

2 - MDC720

No. of Axis on Console

2 - 2 Axis
3 - 3 Axis

Bracket Kit

B - Lathe Pack Option B
D - Lathe Pack Option D
E - Lathe Pack Option E
F - Lathe Pack Option F

Encoder Head Resolution

M - 5µm resolution - EH Series
H - 1µm resolution - EH Series
L - 25µm resolution - EH Series

Console Mounting Hardware

A - Straight arm for machine or wall mounting
B - Offset arm for lathe headstock
C - Boss mount for lathe headstock

Universal Bracket Kit Options

Option B (2 axis)

DRO-BR-533
DRO-BR-544
DRO-BR-545
DRO-BR-546

Option D (3 axis)

(Option B) &
DRO-BR-506

Option E (2 axis)

DRO-BR-533
DRO-BR-544
DRO-BR-545
DRO-BR-546
DRO-BR-505
DRO-BR-598

Option F (3 axis)

(Option E) &
DRO-BR-506



Adaptor Cables and Interfaces

Our adaptor cables allow replacement of either the existing console or encoders with M-DRO equipment. A direct in-line adaptor cable, simple to install. Cable length 150mm.

M-DRO Console to Existing Encoder:

	Encoder Brand	Connector Type
DRO-AD-TY-05A	Acu-rite/Anilam	9 pin D type*
DRO-AD-TY-06	Acu-rite/Anilam	6 pin round
DRO-AD-TY-10	Electronica	9 pin D type
DRO-AD-TY-14	Easson, Knurth, Meister, XPOS	7 pin round
DRO-AD-TY-24	Fagor	15 pin HD
DRO-AD-TY-26	Fagor	15 pin
DRO-AD-TY-03	Mitutoyo	6 pin round
DRO-AD-TY-45	Optimum DPA	9 pin D type
DRO-AD-TY-20	Quark, GCS900	9 pin D type



DRO-AD-TY-06



DRO-AD-TY-14



DRO-AD-TY-24



DRO-AD-TY-26



DRO-AD-TY-03



DRO-AD-TY-02



DRO-AD-TY-15



DRO-AD-TY-23



DRO-AD-TY-04



DRO-AD-TY-27

Existing Console to M-DRO Encoder:

	Console Brand	Connector Type
DRO-AD-TY-01A	Acu-rite/Anilam	9 pin D type*
DRO-AD-TY-02	Acu-rite/Anilam	6 pin round
DRO-AD-TY-11	Electronica	9 pin D type
DRO-AD-TY-15	Easson, Knurth, Meister, XPOS	7 pin round
DRO-AD-TY-23	Fagor	15 pin HD
DRO-AD-TY-25	Fagor	15 pin
DRO-AD-TY-04	Mitutoyo	6 pin round
DRO-AD-TY-44	Optimum DPA	9 pin D type
DRO-AD-TY-21	Quark, GCS900	9 pin D type
DRO-AD-TY-27	XYZ Prototrac	14 pin round

Summing Interface

The summing interface combines the output of two encoders into a single output.

A typical application on a milling machine is to combine quill and knee encoder outputs on the Z axis console input; when lowering the quill or raising the height of the knee, the console will maintain the distance from the spindle to table.



DRO-INT-SDIFF

M-DRO to M-DRO Encoder Extension Cables



9 pin D type Male



9 pin D type Female

	DRO-EX-0.5M	DRO-EX-1M	DRO-EX-2M	DRO-EX-3M	DRO-EX-5M
Length (m)	0.5	1	2	3	5
Cable Type	Metal armoured cable with 9 pin D type				

Non M-DRO Equipment Adaptor Cables

	Console Brand	Connector Type	Encoder Brand	Connector Type (male)
DRO-AD-TY-18	Acu-rite/Anilam	6 pin round	Acu-rite/Anilam	9 pin D type
DRO-AD-TY-19	Acu-rite/Anilam	9 pin D type*	Acu-rite/Anilam	6 pin round
DRO-AD-TY-13	Acu-rite/Anilam	9 pin D type*	Electronica	9 pin D type
DRO-AD-TY-12	Electronica	9 pin D type	Acu-rite/Anilam	9 pin D type
DRO-AD-TY-18	Acu-rite/Anilam	6 pin round	Acu-rite/Anilam	9 pin D type
DRO-AD-TY-09	Newall	9 pin D type	Newall	7 pin round bleecon
DRO-AD-TY-22	Newall	7 pin round	Newall	9 pin D type

* Excludes MillMate and TurnMate models. Acu-rite LCD displays require RS422 signal encoders

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