



**EMERSON**<sup>™</sup>  
Industrial Automation

# Unimotor *fm*



Product Data  
055 to 190 Frames




**CONTROL  
TECHNIQUES**

[www.ctdynamics.com](http://www.ctdynamics.com)


## Introducing the 055 to 190 frames.

**Unimotor**  is a range of brushless AC servo motors which support a winding to suit 200/240V or 400/480V nominal AC drives such as the Unidrive , Unidrive classic, M'Ax and MultiAx range of drives. The range is available in six frame sizes 055:075:095:115:142 and 190mm, each frame size has a number of shaft diameter options and can offer various front flange mounting arrangements. The 190 frame motor has been increased in variants from 4 (A-D) to 8 (A-H). The design also conforms to the sealing standard IP65 (when mounted and connected).

## Standard Features

- \* Modular rotor design.
- \* Rotor assembly balanced to ISO1940 ( BS 6861 ) G 6.3.
- \* Incremental encoder for high precision feedback.
- \* PTC thermistors for thermal monitoring and overload protection.
- \* IP65 standard; sealed against water spray and dust. (IP65 mating connectors must be used)
- \* Vertical connectors for power and signal. **New Feature**
- \* Low inertia is standard for fast acceleration.
- \* UL and cUL recognised motors (075-190 frame motors only). 
- \* IEC mounting flange.
- \* Shaft key as standard.

## Optional Features

- \* Parking brake.
- \* High energy dissipation brake. **New Feature**
- \* 90° fixed or 90° rotatable connectors. **New Feature**
- \* A range of shaft diameter. **New Feature**
- \* Optional IEC and NEMA flanges available. **New Feature**
- \* High inertia.
- \* Other Incremental encoder interfaces available.
- \* Resolver feedback for rugged applications.
- \* Sin/Cos encoder for high resolution and accuracy (single and multi-turn). Other interfaces available.
- \*  **technology** (075-190 frame motors only).
- \* NEMA mounting available.
- \* ATEX motors available (special conditions apply). (075-190 frame motors only).
- \* Plain shaft (non keyed).
- \* Electronic name plating (Available on Sincos motors only). (075-190 frame motors only). **New Feature**
- \* IP 54 rated motors (055 only). **New Feature**

## Optional Products



- \* Cable assemblies for power and signal.  
(Compliant to DESINA standard)

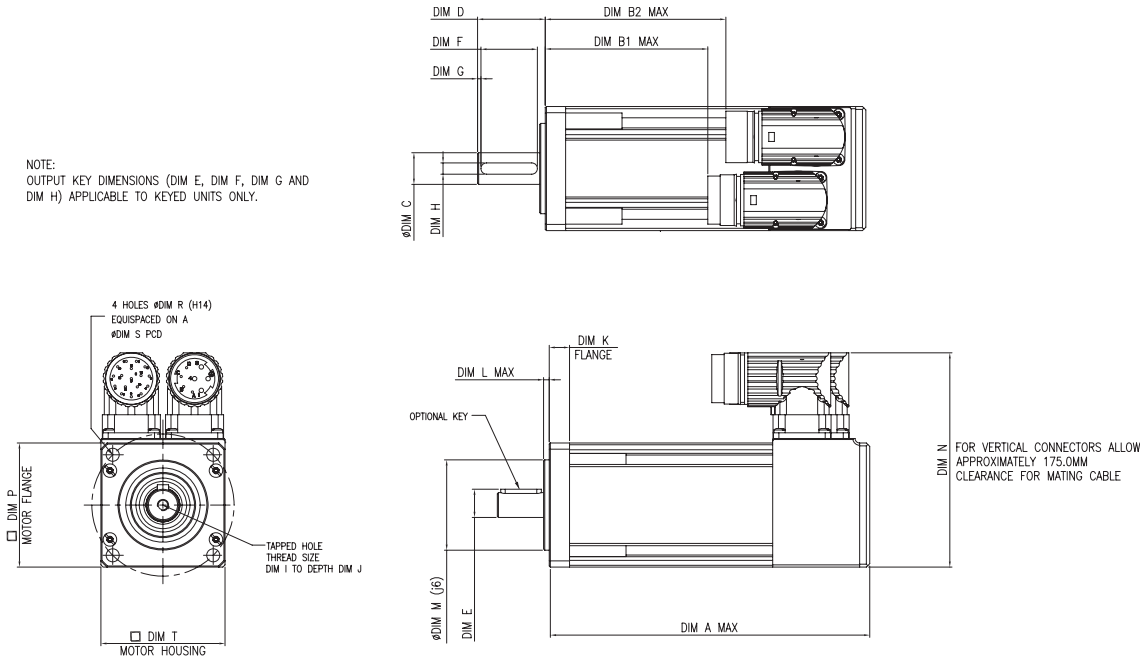


- \* Gearbox options, high precision low backlash or general purpose, parallel shaft or right angle gearboxes available in various ratios.

\* Where volumes have justified it, Control Techniques have designed a number of custom specific motors. Please contact your Drive Centre or Distributor for details.

## Dimensions (mm) Frame size 055

NOTE:  
OUTPUT KEY DIMENSIONS (DIM E, DIM F, DIM G AND  
DIM H) APPLICABLE TO KEYS UNITS ONLY.



### Standard Motor Dimension (mm) Note: All dimensions shown are at maximum

	UNBRAKED Length			BRAKED Length			FLANGE THICKNESS	REGISTER LENGTH	REGISTER DIAMETER	OVERALL HEIGHT	FLANGE SQUARE	FIXING HOLE DIAMETER	FIXING HOLE PCD	MOTOR HOUSING
	A	B1	B2	A	B1	B2								
055A	118.0	48.0	56.0	158.0	88.0	96.0	9.0	2.5	40.0	96.0	55.0	5.8	63.0	55.0
055B	142.0	72.0	80.0	182.0	112.0	120.0								
055C	166.0	96.0	104.0	206.0	136.0	144.0								

### Vertical connectors dimension (mm) Note: All dimensions shown are at maximum

	Unbraked Length		Braked Length		Power Connector	Signal Connector
	B1	B2	B1	B2		
055A	75.0	83.0	115.0	123.0	105.0	93.0
055B	99.0	107.0	139.0	147.0	105.0	93.0
055C	123.0	131.0	163.0	173.0	105.0	93.0

### Shaft Diameter (mm)

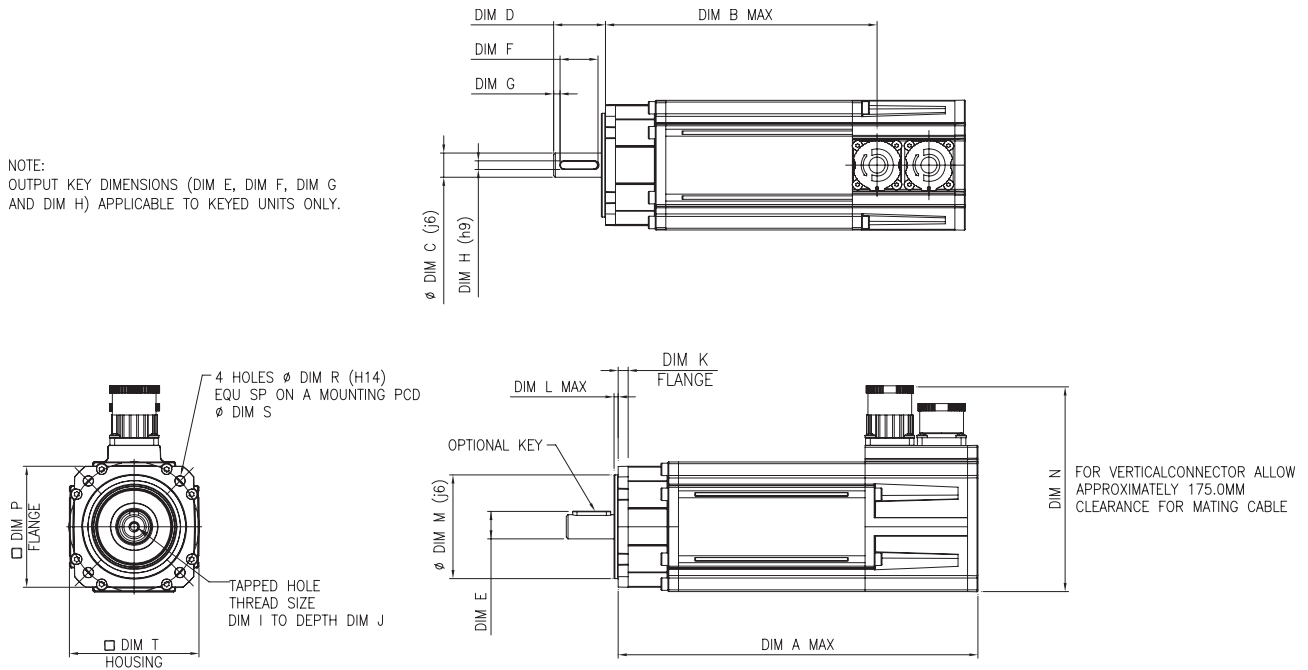
	SHAFT DIAMETER	SHAFT LENGTH	KEY HEIGHT	KEY LENGTH	KEY TO SHAFT END	KEY WIDTH	TAPPED HOLE THREAD SIZE	TAPPED HOLE DEPTH
	C	D	E	F	G	H	I	J
<b>9.0</b>	9.0 (j6)	20.0	10.2	15.0	1.0	3.0	M4	10.0
<b>11.0</b>	11.0 (j6)	23.0	12.5	18.0	1.5	4.0	M4	10.0
<b>14.0</b>	14.0 (j6)	30.0	16.0	25.0	1.5	4.0	M5	12.5

### Optional connector height (mm)

A type	88.0
B type	96.0
C type	96.0
V type	105.0

## Dimensions (mm) Frame size 075

NOTE:  
OUTPUT KEY DIMENSIONS (DIM E, DIM F, DIM G  
AND DIM H) APPLICABLE TO KEYED UNITS ONLY.



## Standard Motor Dimension (mm) Note: All dimensions shown are at maximum

	UNBRAKED Length		BRAKED Length		FLANGE THICKNESS	REGISTER LENGTH	REGISTER DIAMETER	OVERALL HEIGHT VERTICAL	FLANGE SQUARE	FIXING HOLE DIAMETER	FIXING HOLE PCD	MOTOR HOUSING	MOUNTING BOLTS
	A	B	A	B									
075A	209.1	158.2	254.1	203.2	6.3	2.5	60.0	119.5	70.0	6.1	75.0	75.0	M5
075B	239.1	188.2	284.1	233.2									
075C	269.1	218.2	314.1	263.2									
075D	299.1	248.2	344.1	293.2									

## Optional flange motor dimensions (mm)

	UNBRAKED LENGTH		BRAKED LENGTH	
	A	B	A	B
075A	193.5	142.6	238.5	187.6
075B	223.5	172.6	268.5	217.6
075C	253.5	202.6	298.5	247.6
075D	283.5	323.6	328.5	277.6

## Optional flange dimensions (mm)

FIXING HOLE PCD	REGISTER DIAMETER	MOUNTING BOLTS
S	M	
66.7	60 +0/-0.05	M5
80.0	60 (j6)	M5
85.0	70 (j6)	M6

## Optional connector height (mm)

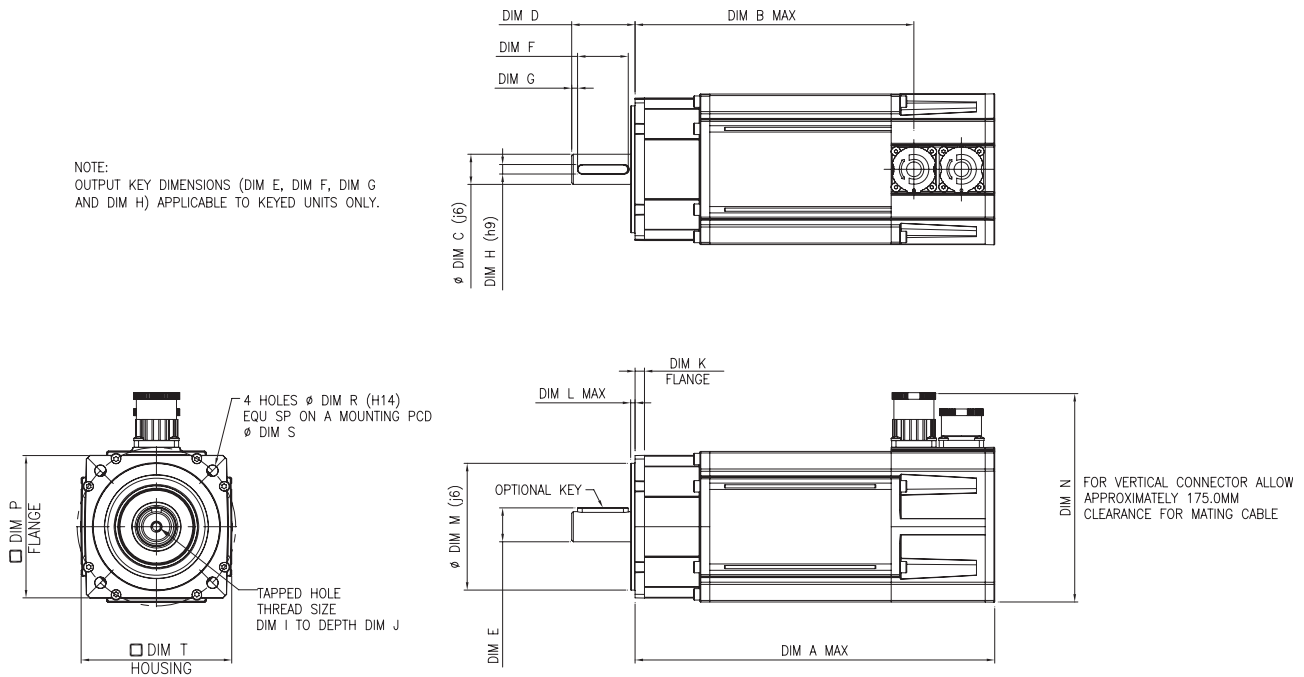
CONNECTION TYPE	OVERALL HEIGHT
	N
A	119.0
B	127.0
C	127.0

## Shaft Diameter (mm)

	SHAFT DIAMETER	SHAFT LENGTH	KEY HEIGHT	KEY LENGTH	KEY TO SHAFT END	KEY WIDTH	TAPPED HOLE THREAD SIZE	TAPPED HOLE DEPTH
	C	D	E	F	G	H	I	J
<b>11.0 A Std</b>	11 (j6)	23.0	12.5	14.0	4.8	4.0	M4	11.0
<b>14.0 B-D Std</b>	14 (j6)	30.0	15.9	22.0	4.8	5.0	M5	13.5
<b>19.0 Max</b>	19 (j6)	40.0	21.4	32.0	4.8	6.0	M6	17.0

## Dimensions (mm) Frame size 095

NOTE:  
OUTPUT KEY DIMENSIONS (DIM E, DIM F, DIM G  
AND DIM H) APPLICABLE TO KEYED UNITS ONLY.



### Standard Motor Dimension (mm) Note: All dimensions shown are at maximum

	UNBRAKED Length		BRAKED Length		FLANGE THICKNESS	REGISTER LENGTH	REGISTER DIAMETER	OVERALL HEIGHT VERTICAL	FLANGE SQUARE	FIXING HOLE DIAMETER	FIXING HOLE PCD	MOTOR HOUSING	MOUNTING BOLTS
	A	B	A	B									
095A	227.8	176.9	272.8	221.9	5.95	2.9	80.0	132.5	90.0	7.0	100.0	95.0	M6
095B	257.8	206.9	302.8	251.9									
095C	287.8	236.9	332.8	281.9									
095D	317.8	266.9	362.8	311.9									
095E	347.8	296.9	392.8	341.9									

### Optional flange motor dimensions (mm)

	UNBRAKED LENGTH		BRAKED LENGTH	
	A	B	A	B
095A	202.7	151.8	247.7	196.8
095B	232.7	181.8	277.7	226.8
095C	262.7	211.8	307.7	256.8
095D	292.7	241.8	337.7	285.8
095E	322.7	270.8	367.7	315.8

### Optional flange dimensions (mm)

FIXING HOLE PCD	REGISTER DIAMETER	MOUNTING BOLTS
S	M	
98.43	73.025 +0/-0.05	M6
115.0	95 (j6)	M8

### Optional connector height (mm)

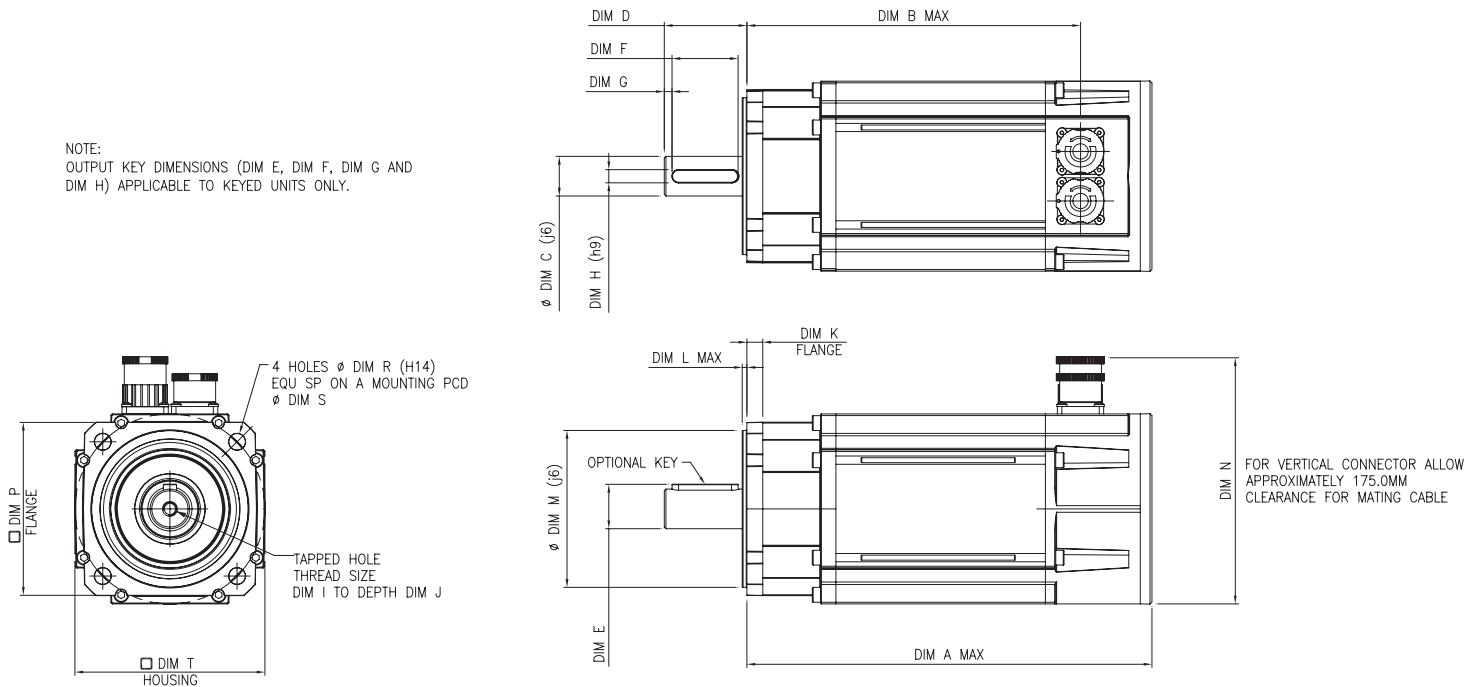
CONNECTION TYPE	OVERALL HEIGHT
	N
A	132.0
B	140.0
C	140.0

### Shaft Diameter (mm)

	SHAFT DIAMETER	SHAFT LENGTH	KEY HEIGHT	KEY LENGTH	KEY TO SHAFT END	KEY WIDTH	TAPPED HOLE THREAD SIZE	TAPPED HOLE DEPTH
	C	D	E	F	G	H	I	J
<b>14.0 A Std</b>	14 (j6)	30.0	15.9	22.0	4.8	5.0	M5	13.5
<b>19.0 B-E Std</b>	19 (j6)	40.0	21.4	32.0	4.8	6.0	M6	17.0
<b>22.0 Max</b>	22 (j6)	50.0	24.4	40.0	5.8	6.0	M8	20.0

## Dimensions (mm) Frame size 115

NOTE:  
OUTPUT KEY DIMENSIONS (DIM E, DIM F, DIM G AND DIM H) APPLICABLE TO KEYED UNITS ONLY.



## Standard Motor Dimension (mm) Note: All dimensions shown are at maximum

	UNBRAKED Length		BRAKED Length		FLANGE THICKNESS	REGISTER LENGTH	REGISTER DIAMETER	OVERALL HEIGHT VERTICAL	FLANGE SQUARE	FIXING HOLE DIAMETER	FIXING HOLE PCD	MOTOR HOUSING	MOUNTING BOLTS
	A	B	A	B									
115A	246.1	203.0	291.1	248.0	10.1	2.9	95.0	150.0	105.0	10.0	115.0	115.0	M8
115B	276.1	233.0	321.1	278.0									
115C	306.1	263.0	351.1	308.0									
115D	336.1	293.0	381.1	338.0									
115E	366.1	323.0	411.1	368.0									

## Optional flange motor dimensions (mm)

	UNBRAKED LENGTH		BRAKED LENGTH	
	A	B	A	B
115A	215.3	172.2	260.3	217.2
115B	245.3	202.2	290.3	247.2
115C	275.3	232.2	320.3	277.2
115D	305.3	262.2	350.3	307.2
115E	335.3	292.2	380.3	337.2

## Optional flange dimensions (mm)

FIXING HOLE PCD	REGISTER DIAMETER	MOUNTING BOLTS
S	M	
125.73	110 +0/-0.05	M8
130.0	110 (j6)	M8
145.0	110 (h7)	M8

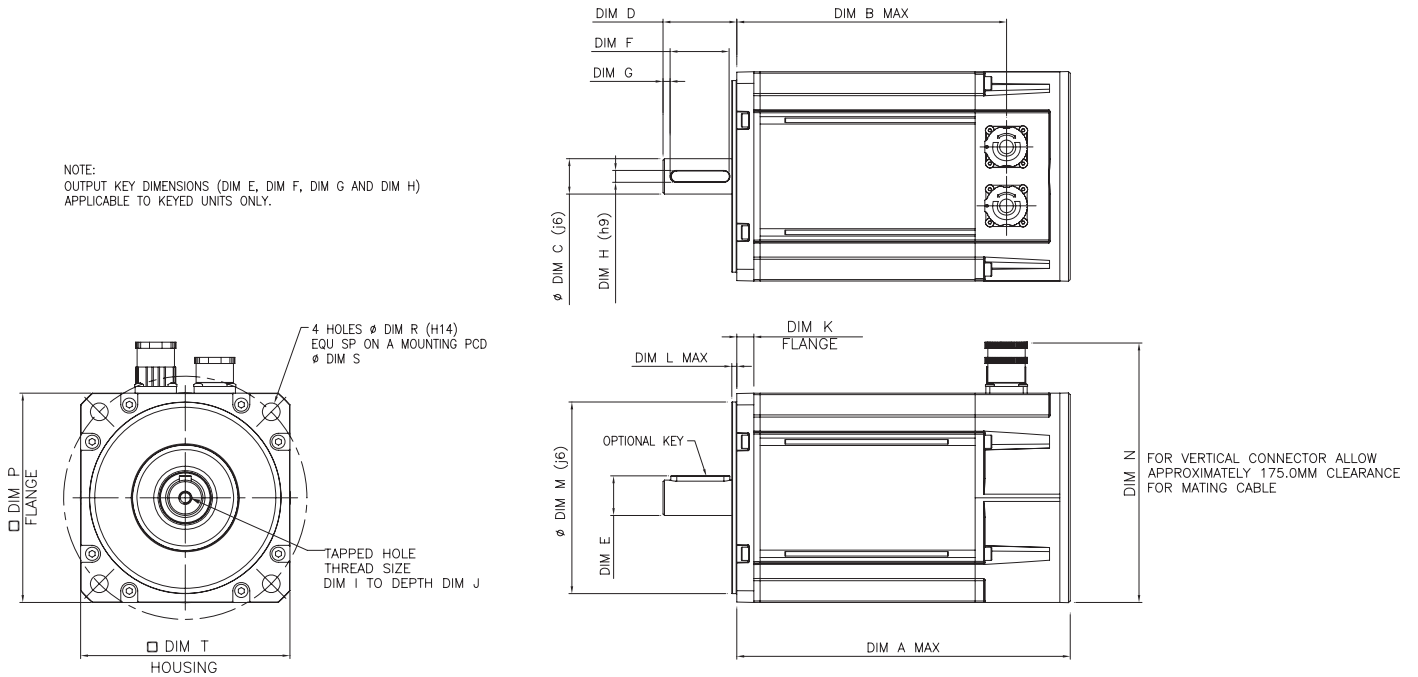
## Optional connector height (mm)

CONNECTION TYPE	OVERALL HEIGHT
	N
A	149.5
B	157.5
C	157.5

## Shaft Diameter (mm)

	SHAFT DIAMETER	SHAFT LENGTH	KEY HEIGHT	KEY LENGTH	KEY TO SHAFT END	KEY WIDTH	TAPPED HOLE THREAD SIZE	TAPPED HOLE DEPTH
	C	D	E	F	G	H	I	J
<b>19.0 A-C std</b>	19 (j6)	40.0	21.4	32.0	4.8	6.0	M6	17.0
<b>22.0 Opt</b>	22 (j6)	50.0	24.4	40.0	5.8	6.0	M8	20.0
<b>24.0 D-E Std</b>	24 (j6)	50.0	26.9	40.0	5.8	8.0	M8	20.0
<b>28.0 Opt</b>	28 (j6)	60.0	30.9	50.0	5.8	8.0	M10	23.0
<b>32.0 Max</b>	32 (k6)	80.0	34.9	70.0	5.8	10.0	M12	29.0

## Dimensions (mm) Frame size 142



### Standard Motor Dimension (mm) Note: All dimensions shown are at maximum

	UNBRAKED Length		BRAKED Length		FLANGE THICKNESS	REGISTER LENGTH	REGISTER DIAMETER	OVERALL HEIGHT VERTICAL	FLANGE SQUARE	FIXING HOLE DIAMETER	FIXING HOLE PCD	MOTOR HOUSING	MOUNTING BOLTS
	A	B	A	B									
142A	227.1	184.0	272.1	229.0	12.1	3.5	130.0	177.0	142.0	12.0	165.0	142.0	M10
142B	257.1	214.0	302.1	259.0									
142C	287.1	244.0	332.1	289.0									
142D	317.1	274.0	362.1	319.0									
142E	347.1	304.0	392.1	349.0									

### Optional flange motor dimensions (mm)

	UNBRAKED LENGTH		BRAKED LENGTH	
	A	B	A	B
142A	277.3	234.2	322.3	279.2
142B	307.3	264.2	352.3	309.2
142C	337.3	294.2	382.3	339.2
142D	367.3	324.2	412.3	369.2
142E	397.3	354.2	442.3	399.2

### Optional flange dimensions (mm)

FIXING HOLE PCD	REGISTER DIAMETER	MOUNTING BOLTS
S	M	
149.23	114.3 +0/-0.076	M8

### Optional connector height (mm)

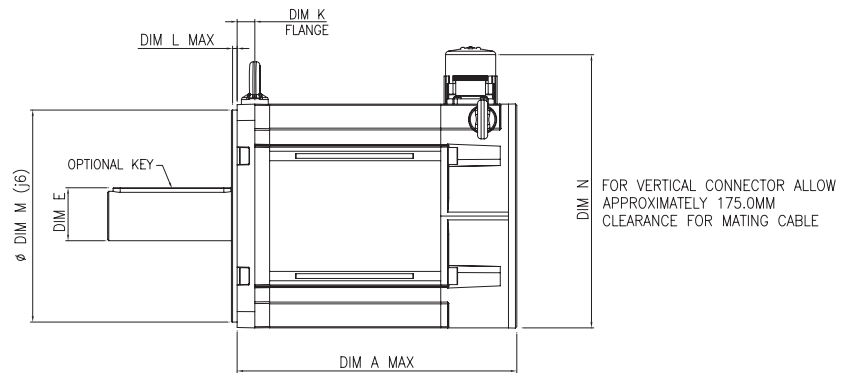
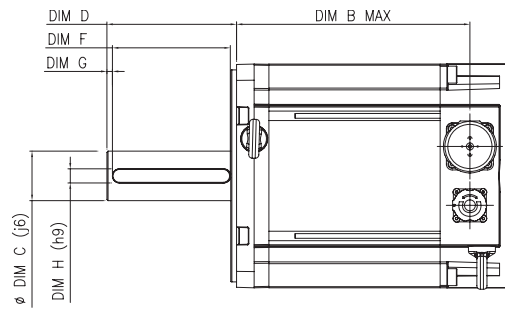
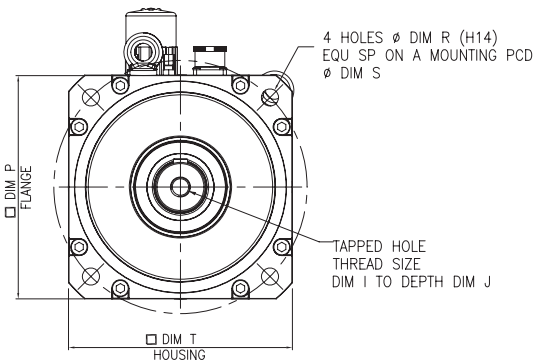
CONNECTION TYPE	OVERALL HEIGHT
	N
A	176.5
B	184.5
C	184.5

### Shaft Diameter (mm)

	SHAFT DIAMETER	SHAFT LENGTH	KEY HEIGHT	KEY LENGTH	KEY TO SHAFT END	KEY WIDTH	TAPPED HOLE THREAD SIZE	TAPPED HOLE DEPTH
	C	D	E	F	G	H	I	J
<b>22.0 Opt</b>	22 (j6)	50.0	24.4	40.0	5.8	6.0	M8	20.0
<b>24.0 A-E Std</b>	24 (j6)	50.0	26.9	40.0	5.8	8.0	M8	20.0
<b>28.0 Opt</b>	28 (j6)	60.0	30.9	50.0	5.8	8.0	M10	23.0
<b>32.0 Max</b>	32 (k6)	80.0	34.9	70.0	5.8	10.0	M12	29.0

## Dimensions (mm) Frame size 190

NOTE:  
OUTPUT KEY DIMENSIONS (DIM E, DIM F, DIM G AND DIM H)  
APPLICABLE TO KEYED UNITS ONLY.



### Standard Motor Dimension (mm) Note: All dimensions shown are at maximum

	UNBRAKED Length		BRAKED Length		FLANGE THICKNESS	REGISTER LENGTH	REGISTER DIAMETER	OVERALL HEIGHT VERTICAL	FLANGE SQUARE	FIXING HOLE DIAMETER	FIXING HOLE PCD	MOTOR HOUSING	MOUNTING BOLTS
	A	B	A	B									
190A	238.3	199.2	319.2	280.1	15.5	4.0	180.0	233.0	190.0	14.5	215.0	190.0	M12
190B	265.2	226.1	346.1	307.0									
190C	292.2	253.1	373.1	334.0									
190D	319.1	280.0	400.0	360.9									
190E	346.1	307.0	427.0	387.9									
190F	373.0	333.9	453.9	414.8									
190G	400.0	360.9	480.9	441.8									
190H	426.9	387.8	507.8	468.7									

### Optional connector height (mm)

CONNECTION TYPE	OVERALL HEIGHT
	N
A	246.0
B	253.5
C	253.5

### Shaft Diameter (mm)

	SHAFT DIAMETER	SHAFT LENGTH	KEY HEIGHT	KEY LENGTH	KEY TO SHAFT END	KEY WIDTH	TAPPED HOLE THREAD SIZE	TAPPED HOLE DEPTH
	C	D	E	F	G	H	I	J
<b>32.0 A-H Std</b>	32 (k6)	80.0	34.9	70.0	5.8	10.0	M12	29.0
<b>38.0 Opt</b>	38 (k6)	80.0	40.9	70.0	5.8	10.0	M12	29.0
<b>42.0 Max</b>	42(k6)	110.0	45.0	100.0	5.8	12.0	M16	37.0

## Motor Selection

**Motor de-rating** – Any adverse operating conditions require that the motor performance be de-rated. These conditions include; ambient temperature above 40°C, motor mounting position, drive switching frequency or the drive being oversized for the motor.

**Ambient temperatures** – The ambient temperature around the motor must be taken into account. For ambient temperatures above 40°C the torque must be de-rated using the following formula as a guideline. (Note: Only applies to 2000/3000rpm motors and assumes copper losses dominate)

$$\text{New de-rated torque} = \text{Specified torque} \times \sqrt{[1 - (\text{Ambient temperature} - 40) / (100)]}$$

For example with an ambient temperature of 76°C the new de-rated torque will be 0.8 x specified torque.

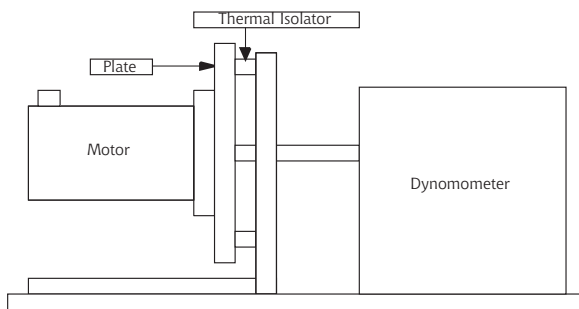
**Mounting arrangements** – The motor torque must be de rated if the motor mounting surface is heated from an external source, such as a gearbox. The motor is connected to a poor thermal conductor. The motor is mounted with the connectors on the side or vertical. The motor is in a confined space with restricted air flow.

**Drive switching frequency** – Most Unidrive SP nominal current ratings are reduced for the higher switching frequencies see Unidrive SP manual for details.

See the table below for the motor de rate factors. These figures are for guidance only.  
(Note: Only applies to motors up to 3000rpm and assumes copper losses dominate)

Motor de rate factors								
Switching frequency	Motor type/frame size							
	075	095	115		142		190	
	A-D	A-E	A-C	D-E	A-C	D-F	A-B	C-H
3kHz	0.93	0.88	0.89	0.84	0.87	0.81	0.98	N/A
4kHz	0.94	0.91	0.91	0.87	0.91	0.86	0.99	0.55
6kHz	0.95	0.93	0.93	0.90	0.94	0.89	0.99	0.77
8kHz	0.98	0.97	0.97	0.95	0.97	0.96	1	0.90
12/16kHz	1	1	1	1	1	1	1	1

**Thermal test conditions** – The performance data shown has been recorded under the following conditions. Ambient temperature 20°C, with the motor mounted on a thermally isolated aluminum plate as shown below.




Motor type	Aluminium Heat sink plate
075-095mm	250 x 250 x 15mm
115-142mm	350 x 350 x 20mm
190mm	500 x 500 x 20mm

**Thermal protection** – Thermistor protection (145°C) is built into the motor windings and gives an indication of serious overheating problems. The installer must connect the thermistor to the drive, failure to do so will invalidate the motor warranty in respect of a burnt out winding.

**Environmental conditions** – Any liquids or gases that may come into contact with the motor must be confirmed to ensure compliance with the correct international standards.

## Ordering Information

Use the information below in the illustration to create an order code for a **Unimotor** .  
The details in the band are an example of an order reference. (Std = Standard selection Opt = Optional selection).

095	U	2	B	30	1	V
Frame Size	Motor voltage*	Peak torque selection*	Stator length*	Rated Speed*	Brake*	Connection Type*
<b>055</b> <b>075</b> <b>095</b> <b>115</b> <b>142</b> <b>190</b>	<b>E</b> = 230V <b>U</b> = 400V	<b>055 Frame only</b>	<b>A</b> <b>B</b> <b>C</b> <b>D</b> <b>E</b> <b>F</b> <b>G</b> <b>H</b>	<b>055 Frame only</b>	<b>055 Frame only</b>	<b>055 Frame only</b>
		<b>2</b> = Standard peak torque		<b>30</b> = 3000 rpm (Std) <b>60</b> = 6000 rpm	<b>0</b> = Not fitted (Std) <b>1</b> = Parking brake fitted 24Vdc <b>X</b> = Special	<b>B</b> = Power and Signal 90° rotatable (Std) <b>C</b> = Power 90° rotatable and Signal vertical <b>V</b> = Power and Signal vertical <b>X</b> = Special
		<b>075-190 Frame only</b>		<b>075-190 Frame only</b>	<b>075-190 Frame only</b>	<b>075-190 Frame only</b>
		<b>2</b> = Standard peak torque <b>P</b> = High peak torque		<b>10</b> = 1000 rpm <b>20</b> = 2000 rpm <b>25</b> = 2500 rpm <b>30</b> = 3000 rpm (Std) <b>40</b> = 4000 rpm <b>45</b> = 4500 rpm <b>50</b> = 5000 rpm <b>60</b> = 6000 rpm	<b>0</b> = Not fitted (Std) <b>1</b> = Parking brake fitted 24Vdc <b>5</b> = High energy dissipation <b>X</b> = Special	<b>A</b> = Power and Signal 90° fixed <b>B</b> = Power and Signal 90° rotatable <b>C</b> = Power 90° rotatable and Signal vertical <b>V</b> = Power and Signal vertical (Std) <b>X</b> = Special

\* Not available on some frame sizes. Please consult Drive Centre or Distributor for details.

\*\* Optional PCD's will have a different register diameter from the standard motors. Please consult Drive Centre or Distributors for details.

<b>A</b>		<b>CA</b>		<b>A</b>		<b>100</b>		<b>190</b>	
<b>Output shaft</b>	<b>Feedback device</b>			<b>Inertia</b>	<b>PCD***</b>		<b>Shaft Diameter***</b>		
<b>A</b> = Key (Std) <b>B</b> = Plain shaft <b>X</b> = Special	<b>055 Frame only</b>			<b>A</b> = Standard <b>B</b> = High	<b>055 frame only</b>				
	<b>AR</b> = Resolver <b>CP</b> = Incremental Encoder      4096 ppr <b>MP</b> = Incremental Encoder      2048 ppr <b>TL</b> = Optical Sincos Multi turn    SKM 36 <b>TM</b> = Optical Sincos Multi turn    EQN 1125 <b>UL</b> = Optical Sincos Single turn    SKS 36 <b>UM</b> = Optical Sincos Single turn    ECN 1113 <b>XX</b> = Special	<b>063</b> Std <b>09.0</b> Opt <b>070</b> Opt <b>11.0</b> A-C Std <b>14.0</b> Max							
<b>075-190 Frame only</b>				<b>075 frame only</b>					
<b>AE</b> = Resolver <b>CA</b> = Incremental Encoder      4096 ppr <b>MA</b> = Incremental Encoder      2048 ppr <b>RA</b> = Optical Sincos Multi turn    SRM 50 <b>RB</b> = Optical Sincos Multi turn    EQN 1325 <b>SA</b> = Optical Sincos Single turn    SRS 50 <b>SB</b> = Optical Sincos Single turn    ECN 1313 <b>VC</b> = Inductive Sincos Multi turn    EQI 1329 <b>WC</b> = Inductive Sincos Single turn    ECI 1317 <b>XX</b> = Special				<b>075</b> Std <b>11.0</b> A Std <b>080</b> Opt <b>14.0</b> B-D Std <b>085</b> Opt <b>19.0</b> Max					
				<b>095 frame only</b>					
				<b>100</b> Std <b>14.0</b> A Std <b>098</b> Opt <b>19.0</b> B-E Std <b>115</b> Opt <b>22.0</b> Max					
				<b>115 frame only</b>					
				<b>115</b> Std <b>19.0</b> A-C Std <b>130</b> Opt <b>24.0</b> D-E Std <b>145</b> Opt <b>32.0</b> Max					
				<b>142 frame only</b>					
				<b>165</b> Std <b>24.0</b> A-E Std <b>149</b> Opt <b>32.0</b> Max					
				<b>190 frame only</b>					
				<b>215</b> Std <b>32.0</b> A-H Std <b>42.0</b> Max					

## Unimotor For 3 Phase VPWM Drives 200-240Vrms

$\Delta t = 100^\circ\text{C}$  winding  $40^\circ\text{C}$  maximum ambient

All data subject to +/-10% tolerance

Motor Frame Size (mm)	055E2			075E2				095E2				
Frame Length	A	B	C	A	B	C	D	A	B	C	D	E
Continuous Stall Torque (Nm)	0.72	1.40	2.11	1.2	2.2	3.1	3.9	2.3	4.3	5.9	7.5	9.0
Standard (2) Peak Torque selection max (Nm)	2.75	5.50	8.25	3.6	6.6	9.3	11.7	6.9	12.9	17.7	22.5	27.0
High (P) Peak Torque selection max (Nm)	N/A	N/A	N/A	6	11	15.5	19.5	10.4	19.4	26.6	33.8	40.5
Standard Inertia (kgcm <sup>2</sup> )	0.12	0.23	0.34	0.7	1.2	1.6	2.0	1.8	2.9	4.0	5.1	6.2
High Inertia (kgcm <sup>2</sup> )				1.1	1.5	2.0	2.4	3.7	4.8	5.9	7.0	8.1
Winding Thermal Time Const. (sec)				81	74	94	100	172	168	183	221	228
Maximum Cogging (Nm)	0.03	0.05	0.07	0.02	0.03	0.04	0.05	0.03	0.06	0.08	0.10	0.13
Standard motor weight unbraked (kg)	1.20	1.50	1.80	3.60	4.40	5.20	6.00	5.10	6.30	7.50	8.70	9.90
Standard motor weight braked (kg)	1.60	1.90	2.20	4.10	4.90	5.70	6.50	5.70	6.90	8.70	9.30	10.50
<b>Rated Speed 2000 (rpm)</b>	$K_t$ (Nm/A) = $K_e$ (V/krpm) =			$K_t$ (Nm/A) = 1.40 $K_e$ (V/krpm) = 85.50								
Rated Torque (Nm)	C/D	C/D	C/D	1.1	2.1	3.0	3.8	2.2	4.0	5.5	6.9	8.2
Stall Current (A)				0.9	1.6	2.3	2.8	1.7	3.1	4.3	5.4	6.5
Rated Power (kW)				0.23	0.44	0.63	0.80	0.46	0.84	1.15	1.45	1.72
R (ph-ph) (Ohms)				45.8	15.3	8.5	5.72	19.4	6.2	3.16	2.31	1.71
L (ph-ph) (mH)				98.8	43.4	27.9	20.2	59.2	25.8	16.0	12.6	10.1
<b>Rated Speed 3000 (rpm)</b>	$K_t$ (Nm/A) = $K_e$ (V/krpm) =			$K_t$ (Nm/A) = 0.93 $K_e$ (V/krpm) = 57.00								
Rated Torque (Nm)	0.60	1.20	1.80	1.1	2.0	2.8	3.5	2.0	3.9	5.4	6.8	8.1
Stall Current (A)	0.98	1.68	2.46	1.3	2.4	3.4	4.2	2.5	4.7	6.4	8.1	9.7
Rated Power (kW)	0.21	0.43	0.64	0.35	0.63	0.88	1.10	0.63	1.23	1.70	2.14	2.54
R (ph-ph) (Ohms)	30.0	14.7	9.6	18.9	6.26	3.50	2.38	8.03	2.68	1.57	1.03	0.77
L (ph-ph) (mH)	67.3	43.0	30.9	42.5	18.4	11.9	8.82	25.6	12.0	7.91	5.60	4.65
<b>Rated Speed 4000 (rpm)</b>	$K_t$ (Nm/A) = $K_e$ (V/krpm) =			$K_t$ (Nm/A) = 0.72 $K_e$ (V/krpm) = 44.00								
Rated Torque (Nm)	C/D	C/D	C/D	1.0	1.7	2.3	2.9	1.8	3.0	4.0	4.9	5.7
Stall Current (A)				1.7	3.1	4.4	5.5	3.2	6.0	8.2	10.5	12.5
Rated Power (kW)				0.42	0.71	0.96	1.21	0.75	1.26	1.68	2.05	2.39
R (ph-ph) (Ohms)				10.2	3.39	1.92	1.48	5.15	1.64	0.92	0.62	0.43
L (ph-ph) (mH)				24.6	10.8	7.14	5.42	15.5	6.77	4.61	3.46	2.54
<b>Rated Speed 6000 (rpm)</b>	$K_t$ (Nm/A) = $K_e$ (V/krpm) =			$K_t$ (Nm/A) = 0.47 $K_e$ (V/krpm) = 28.50								
Rated Torque (Nm)	0.48	0.91	1.35	0.9	1.6	2.1	2.6	1.3	2.1	2.8	C/D	C/D
Stall Current (A)	1.66	3.33	4.80	2.6	4.7	6.6	8.3	4.9	9.2	12.6		
Rated Power (kW)	0.33	0.63	0.99	0.57	1.01	1.32	1.63	0.82	1.32	1.76		
R (ph-ph) (Ohms)	9.6	3.8	2.5	4.5	1.49	0.95	0.65	2.01	0.67	0.35		
L (ph-ph) (mH)	21.5	11.1	8.1	10.7	4.73	3.10	2.33	6.41	3.01	1.77		

## For 3 Phase VPWM Drives 200-240Vrms

Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12kHz drive switching frequency.  
All other figures relate to a 20°C motor temperature.  
Maximum intermittent winding temperature is 140°C.

115E2					142E2						190E2							
A	B	C	D	E	A	B	C	D	E	F	A	B	C	D	E	F	G	H
3.5	6.6	9.4	12.4	15.3	5.7	10.8	15.3	19.8	23.4	C/D	C/D	21.8	C/D	41.1	C/D	58.7	C/D	73.2
10.5	19.8	28.2	37.2	45.9	17.1	32.4	45.9	59.4	70.2			65.4		123.0		176.0		219.0
14	26.4	37.6	49.6	61.2	22.8	43.2	61.2	79.2	93.6		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4.4	6.7	9.0	11.4	13.8	9.0	15.6	22.2	28.8	35.4			48.7		86.4		123.1		161.8
9.5	11.8	14.1	16.6	18.9	23.3	29.9	36.5	43.1	49.7			93.9		131.6		168.3		207.0
175	185	198	217	241	213	217	275	301	365			240		242		319		632
0.06	0.10	0.14	0.18	0.21	0.09	0.16	0.23	0.30	0.35			0.30		0.54		0.72		0.99
7.80	9.70	11.60	13.50	15.40	10.00	13.30	16.10	18.90	21.70			25.30		33.90		42.50		51.30
9.00	10.90	12.80	14.70	17.20	12.20	15.00	17.80	19.60	23.40			27.30		35.90		44.50		53.10
3.2	6.1	8.7	10.8	14.0	5.3	10.3	14.6	18.4	21.3	C/D	C/D	20.0	C/D	36.9	C/D	50.4	C/D	C/D
2.5	4.8	6.8	8.9	11.0	4.1	7.8	11.0	14.2	16.8			15.6		29.4		42.0		
0.67	1.28	1.82	2.26	2.93	1.11	2.16	3.06	3.85	4.46			4.19		7.73		10.6		
9.09	2.82	1.51	0.99	0.82	4.28	1.33	0.75	0.45	0.32			0.50		0.15		0.10		
47.3	20.6	13.1	9.54	7.86	33.7	15.1	10.3	6.96	5.58			7.98		3.32		2.73		
3.0	5.5	8.1	10.4	12.6	4.9	9.0	12.2	15.8	N/A	N/A	C/D	19.2	C/D	33.0	C/D	C/D	C/D	N/A
3.8	7.1	10.2	13.4	16.5	6.2	11.7	16.5	21.3				23.5		44.2				
0.94	1.73	2.54	3.27	3.96	1.54	2.83	3.83	4.96				6.03		10.4				
4.01	1.30	0.73	0.47	0.37	1.90	0.59	0.31	0.20				0.25		0.08				
20.1	9.16	6.07	4.26	3.49	15.0	6.85	4.20	1.94				3.98		1.87				
2.5	4.7	6.3	7.5	C/D	3.6	7.0	C/D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4.9	9.2	13.1	17.3		8.0	15.0												
1.05	1.97	2.64	3.14		1.51	2.93												
2.62	0.82	0.44	0.29		1.20	0.36												
12.6	5.48	3.57	2.53		9.45	4.08												
2.2	4.0	C/D	N/A	N/A	2.9	C/D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7.5	14.1				12.2													
1.38	2.51				1.82													
0.96	0.30				0.49													
4.80	2.09				3.96													

## Unimotor Servo motor for 3 Phase VPWM Drives 380-480Vrms

$\Delta t = 100^\circ\text{C}$  winding  $40^\circ\text{C}$  maximum ambient

All data subject to +/-10% tolerance

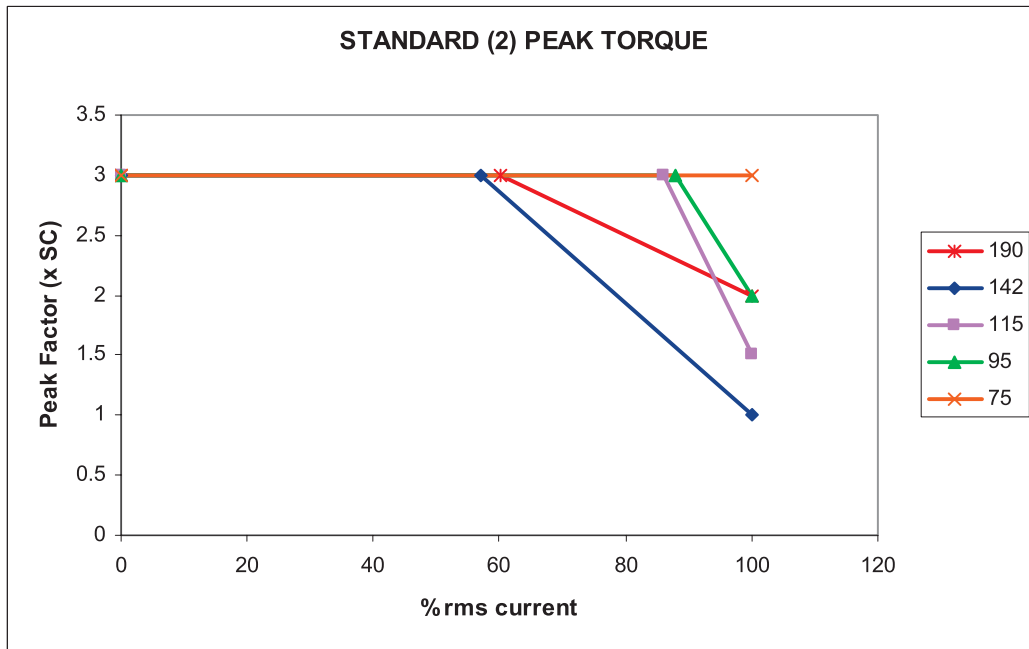
Motor Frame Size (mm)	055U2			075U2				095U2				
Frame Length	A	B	C	A	B	C	D	A	B	C	D	E
Continuous Stall Torque (Nm)	0.72	1.40	2.11	1.2	2.2	3.1	3.9	2.3	4.3	5.9	7.5	9.0
Standard (2) Peak Torque selection max (Nm)	2.75	5.50	8.25	3.6	6.6	9.3	11.7	6.9	12.9	17.7	22.5	27.0
High (P) Peak Torque selection max (Nm)	N/A	N/A	N/A	6	11	15.5	19.5	10.4	19.4	26.6	33.8	40.5
Standard Inertia (kgcm <sup>2</sup> )	0.12	0.23	0.34	0.7	1.2	1.6	2.0	1.8	2.9	4.0	5.1	6.2
High Inertia (kgcm <sup>2</sup> )				1.1	1.5	2.0	2.4	3.7	4.8	5.9	7.0	8.1
Winding Thermal Time Const. (sec)				81	74	94	100	172	168	183	221	228
Maximum Cogging (Nm)	0.03	0.05	0.07	0.02	0.03	0.04	0.05	0.03	0.06	0.08	0.10	0.13
Standard motor weight unbraked (kg)	1.20	1.50	1.80	3.60	4.40	5.20	6.00	5.10	6.30	7.50	8.70	9.90
Standard motor weight braked (kg)	1.60	1.90	2.20	4.10	4.90	5.70	6.50	5.70	6.90	8.70	9.30	10.50
<b>Rated Speed 2000 (rpm)</b>	$K_t$ (Nm/A) = $K_e$ (V/krpm) =			$K_t$ (Nm/A) = 2.40 $K_e$ (V/krpm) = 147.00								
Rated Torque (Nm)	C/D	C/D	C/D	1.1	2.1	3.0	3.8	2.2	4.0	5.5	6.9	8.2
Stall Current (A)				0.5	1.0	1.3	1.7	1.0	1.8	2.5	3.2	3.8
Rated Power(kW)				0.23	0.44	0.63	0.80	0.46	0.84	1.15	1.45	1.72
R (ph-ph) (Ohms)				144	48.2	25.0	15.7	59.0	17.0	9.90	6.00	4.30
L (ph-ph) (mH)				214	99.2	59.2	44.7	131	54.5	36.5	25.6	18.9
<b>Rated Speed 3000 (rpm)</b>	$K_t$ (Nm/A) = $K_e$ (V/krpm) =			$K_t$ (Nm/A) = 1.60 $K_e$ (V/krpm) = 98.00								
Rated Torque (Nm)	0.60	1.20	1.80	1.1	2.0	2.8	3.5	2.0	3.9	5.4	6.8	8.1
Stall Current (A)	0.98	0.95	1.34	0.8	1.4	2.0	2.5	1.5	2.7	3.7	4.7	5.7
Rated Power(kW)	0.21	0.43	0.64	0.35	0.63	0.88	1.10	0.63	1.23	1.70	2.14	2.54
R (ph-ph) (Ohms)	30.0	46.0	32.0	60.8	20.1	10.5	7.5	24.5	6.80	4.00	2.50	2.00
L (ph-ph) (mH)	67.3	132.3	103.0	98.4	41.8	27.6	19.7	57.9	24.3	15.5	10.9	8.50
<b>Rated Speed 4000 (rpm)</b>	$K_t$ (Nm/A) = $K_e$ (V/krpm) =			$K_t$ (Nm/A) = 1.20 $K_e$ (V/krpm) = 73.50								
Rated Torque (Nm)	C/D	C/D	C/D	1.0	1.7	2.3	2.9	1.8	3.0	4.0	4.9	5.7
Stall Current (A)				1.0	1.9	2.6	3.3	2.0	3.6	5.0	6.3	7.5
Rated Power(kW)				0.42	0.71	0.96	1.21	0.75	1.26	1.68	2.05	2.39
R (ph-ph) (Ohms)				36.8	10.5	6.30	4.20	12.7	4.08	2.10	1.50	1.03
L (ph-ph) (mH)				54.9	24.8	14.9	10.8	31.5	13.6	8.50	6.30	4.80
<b>Rated Speed 6000 (rpm)</b>	$K_t$ (Nm/A) = $K_e$ (V/krpm) =			$K_t$ (Nm/A) = 0.80 $K_e$ (V/krpm) = 49.00								
Rated Torque (Nm)	0.48	0.91	1.35	0.9	1.6	2.1	2.6	1.3	2.1	2.8	C/D	C/D
Stall Current (A)	0.98	1.91	2.68	1.5	2.8	3.9	4.9	2.9	5.4	7.4		
Rated Power(kW)	0.33	0.63	0.99	0.57	1.01	1.32	1.63	0.82	1.32	1.76		
R (ph-ph) (Ohms)	30.0	11.4	8.0	15.0	5.00	2.66	1.90	5.45	1.82	1.05		
L (ph-ph) (mH)	67.3	33.1	25.7	24.0	10.6	6.80	4.80	14.1	6.00	3.80		

# Servo motor for 3 Phase VPWM Drives 380-480Vrms

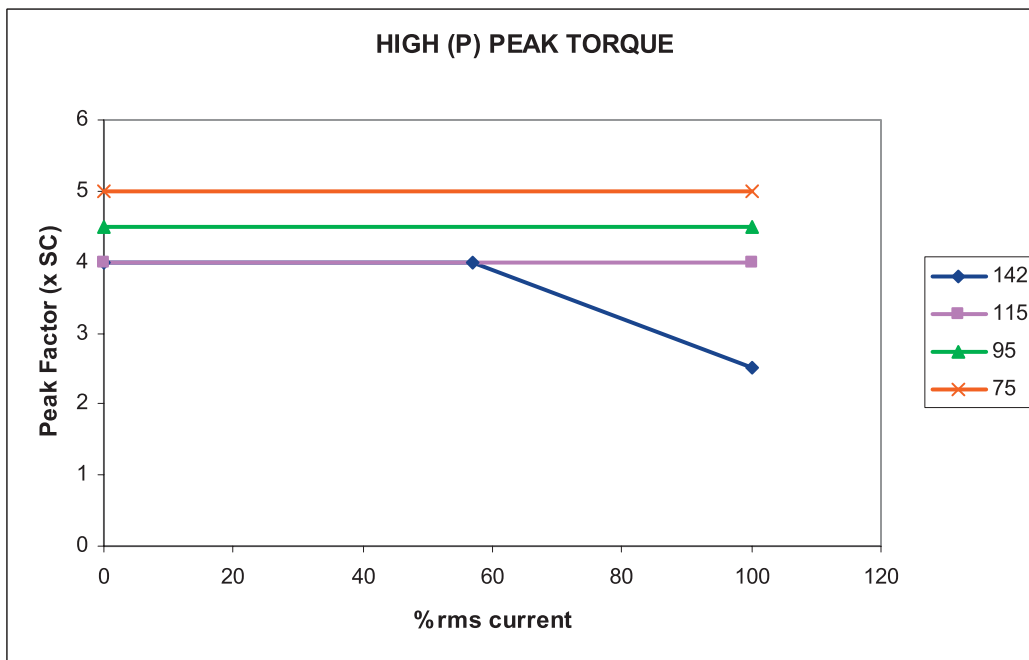
Stall torque, rated torque and power relate to maximum continuous operation tested in a 20°C ambient at 12kHz drive switching frequency.  
All other figures relate to a 20°C motor temperature.  
Maximum intermittent winding temperature is 140°C.

115U2					142U2						190U2							
A	B	C	D	E	A	B	C	D	E	F	A	B	C	D	E	F	G	H
3.5	6.6	9.4	12.4	15.3	5.7	10.8	15.3	19.8	23.4	C/D	9.6	21.8	31.1	41.1	50.6	58.7	66.0	73.2
10.5	19.8	28.2	37.2	45.9	17.1	32.4	45.9	59.4	70.2		28.8	65.4	93.3	123	151.6	176	198.0	219
14	26.4	37.6	49.6	61.2	22.8	43.2	61.2	79.2	93.6		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4.4	6.7	9.0	11.4	13.8	9.0	15.6	22.2	28.8	35.4		29.9	48.7	67.5	86.4	105.0	123.1	142.9	161.8
9.5	11.8	14.1	16.6	18.9	23.3	29.9	36.5	43.1	49.7		75.1	93.9	112.7	131.6	150.2	168.3	188.1	207
175	185	198	217	241	213	217	275	301	365		217	240	241	242	281	319	476	632
0.06	0.10	0.14	0.18	0.21	0.09	0.16	0.23	0.30	0.35		0.12	0.30	0.40	0.54	0.66	0.72	0.86	0.99
7.80	9.70	11.60	13.50	15.40	10.00	13.30	16.10	18.90	21.70		21.00	25.30	29.60	33.90	38.20	42.50	46.80	51.30
9.00	10.90	12.80	14.70	17.20	12.20	15.00	17.80	19.60	23.40		23.00	27.30	31.60	35.90	40.20	44.50	48.80	53.10
3.2	6.1	8.7	10.8	14.0	5.3	10.3	14.6	18.4	21.3	C/D	9.3	20.0	28.4	36.9	43.8	50.4	53.0	54.7
1.5	2.8	4.0	5.2	6.4	2.4	4.5	6.4	8.3	9.8		4.0	9.1	13.0	17.2	21.1	24.5	27.5	30.5
0.67	1.28	1.82	2.26	2.93	1.11	2.16	3.06	3.85	4.46		1.90	4.19	5.90	7.73	9.20	10.6	11.1	11.5
27.8	8.55	4.55	2.96	2.17	12.5	3.60	2.10	1.35	0.98		6.15	1.80	0.83	0.56	0.39	0.33	0.30	0.23
94.6	40.5	25.7	18.6	14.7	58.0	29.8	18.7	13.6	10.7		52.90	28.10	15.00	13.0	8.68	8.90	6.73	6.30
3.0	5.5	8.1	10.4	12.6	4.9	9.0	12.2	15.8	18.0	C/D	8.7	19.2	25.0	33.0	34.0	35.0	36.0	36.8
2.2	4.2	5.9	7.8	9.6	3.6	6.8	9.6	12.4	14.7		6.0	13.7	19.4	25.7	31.6	36.7	41.3	45.8
0.94	1.73	2.54	3.27	3.96	1.54	2.83	3.83	4.96	5.65		2.73	6.03	7.85	10.4	10.7	11.0	11.3	11.6
12.6	3.86	2.02	1.40	1.10	5.63	1.72	0.94	0.61	0.44		2.73	0.79	0.41	0.30	0.17	0.14	0.13	0.09
43.1	18.6	11.4	8.60	7.40	31.0	13.3	8.30	6.10	4.80		23.50	13.20	7.35	6.11	3.86	3.60	2.99	2.46
2.5	4.7	6.3	7.5	8.7	3.6	7.0	8.9	10.7	12.2	N/A	C/D	C/D	C/D	C/D	N/A	N/A	N/A	N/A
3.0	5.5	7.9	10.4	12.8	4.8	9.0	12.8	16.5	19.5									
1.05	1.97	2.64	3.14	3.64	1.51	2.93	3.73	4.48	5.11									
6.91	2.14	1.16	0.73	0.57	3.12	1.00	0.53	0.35	0.24									
23.5	10.2	6.60	4.70	3.90	17.6	7.50	4.70	3.60	2.70									
2.2	4.0	C/D	C/D	N/A	2.9	4.5	C/D	C/D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4.4	8.3				7.2	13.5												
1.38	2.51				1.82	2.83												
3.10	0.97				1.42	0.46												
15.5	4.81				7.72	3.44												

**Peak Torque Information**



Peak Torque defined for a maximum period of 250 ms, RMS 3000 rpm,  $\Delta T_{max} = 100^{\circ}C$ ,  $40^{\circ}C$  ambient.  
SC = Stall Current



Peak Torque defined for a maximum period of 250 ms, RMS 3000 rpm,  $\Delta T_{max} = 100^{\circ}C$ ,  $40^{\circ}C$  ambient.  
SC = Stall Current

## Motor Specification

### Low Voltage Directive 2006/95/EC

Note: Machinery Directive 89/392/EEC amended to 98/37/EC Low Voltage Directive 73/23/EEC superseded by directive 2006/95/EC on 16/01/07, which specifically excludes electric motors.

#### EN 60034 General requirements for rotating electrical machinery

EN 60034-1	Duty: S1 Continuous Storage: -15°C to +40°C Operating: Min ambient 0°C; max ambient 40°C Less than 1000M altitude Relative humidity: 90% non condensing
EN 60034-5	Degree of Ingress protection: IP65 (when mounted and connected)
EN 60034-6	Method of cooling: free circulation, free convection
EN 60034-7	Flange mounted: horizontally or vertically
EN 60034-8	Terminal markings: U V W,
EN 60034-11	Thermal protection: PTC thermistor, 145°C on 075-190 motors Thermal protection: PTC thermistor, 150°C on 055 motors
EN 60034-18	Insulation system: Class F 600V, UL number E214439 on 075-190 motors Insulation system: Class F 600V, on 055 motors
EN 60034-25	The design and performance of motors specifically designed for converter supply

#### EN 60072 Dimensions and output for rotating electrical machines

EN 60072-1	Type N (Customer variants)
ISO1940-1	Balancing: to G6.3, (ISO8821 half key convention)

Standard equipment is not deemed suitable for use in an explosive atmosphere. (ATEX motors are available, please contact your Drive Centre or Distributor for details).

This product has been designed to be operated with Control Techniques Servo drives and must not be put into service unless the machinery into which it is to be incorporated has been declared in conformity with the provisions of the machinery directive.

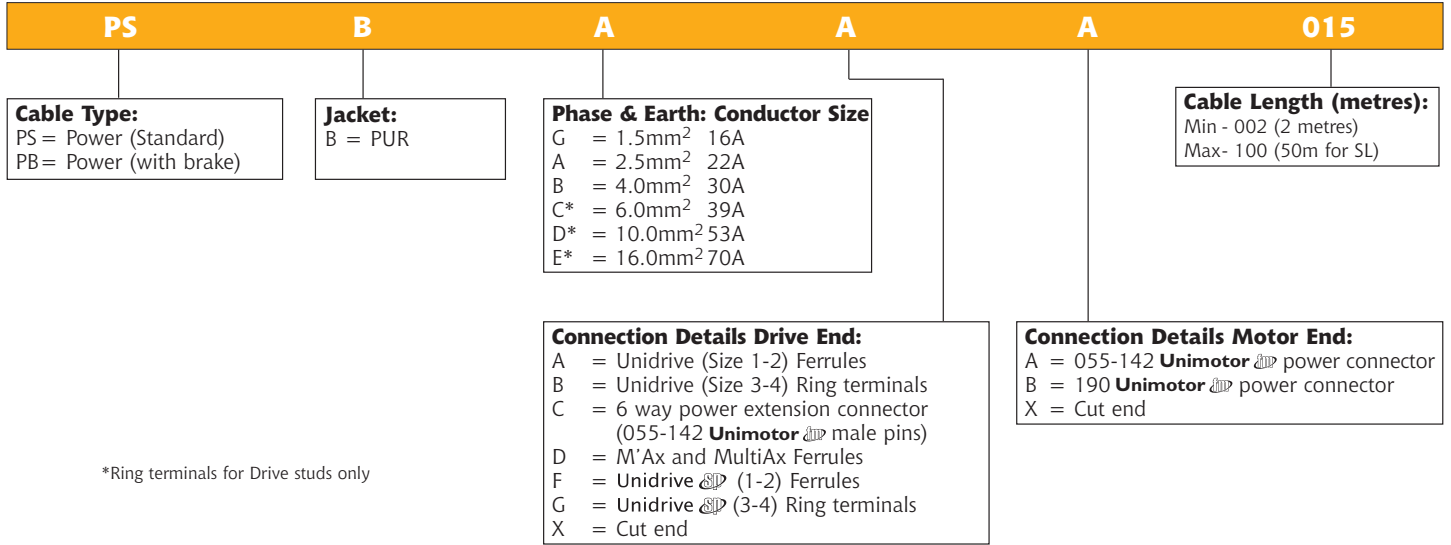
## Standard Brake Specification

Motor Frame	Supply Volts	Input Power	Static Torque		Release Time	Moment of Inertia	Backlash
			Standard brake	High energy brake			
Size	VDC	Watts	Nm	Nm	ms nom	kgcm <sup>2</sup> *	Degrees**
055	24	6.3	1.8	N/A	22	0.03	0.75
075	24	6.3	2	2.2	22	0.07	1.03
095	24	16	11	12.2	60	0.39	0.94
115	24	16	11	12.2	60	0.44	0.56
142	24	19.5	18	22	75	0.54	0.56
190(A-D)	24	25	38	42	95	3.07	0.77
190(E-H)	24	25	60	67	120	4.95	0.77

\*Note 1 kgcm<sup>2</sup> = 1x10<sup>-4</sup>kgm<sup>2</sup> \*\*Backlash figure will increase with time

- The brakes are intended for parking duty and are not for dynamic or safety use.
- The brake will engage when power is removed.
- Refer to your Drive Centre or Distributor if your application requires dynamic braking in emergency conditions.
- To provide protection to the brake control circuit it is recommended that a diode is connected across the output terminals of the solid state or relay contacts devices.
- Larger torque brakes are available as an option. Please contact your Drive Centre or Distributor for details.
- Figures are shown at 20°C brake temperature. Apply the de rate factor of 0.7 to the standard brake torque figures if motor temperature is above 100°C. The de rate factor does not apply to the High energy brake.

## Cable Information



**Cable type** - PS for motor without brakes, PB for motors with brake.

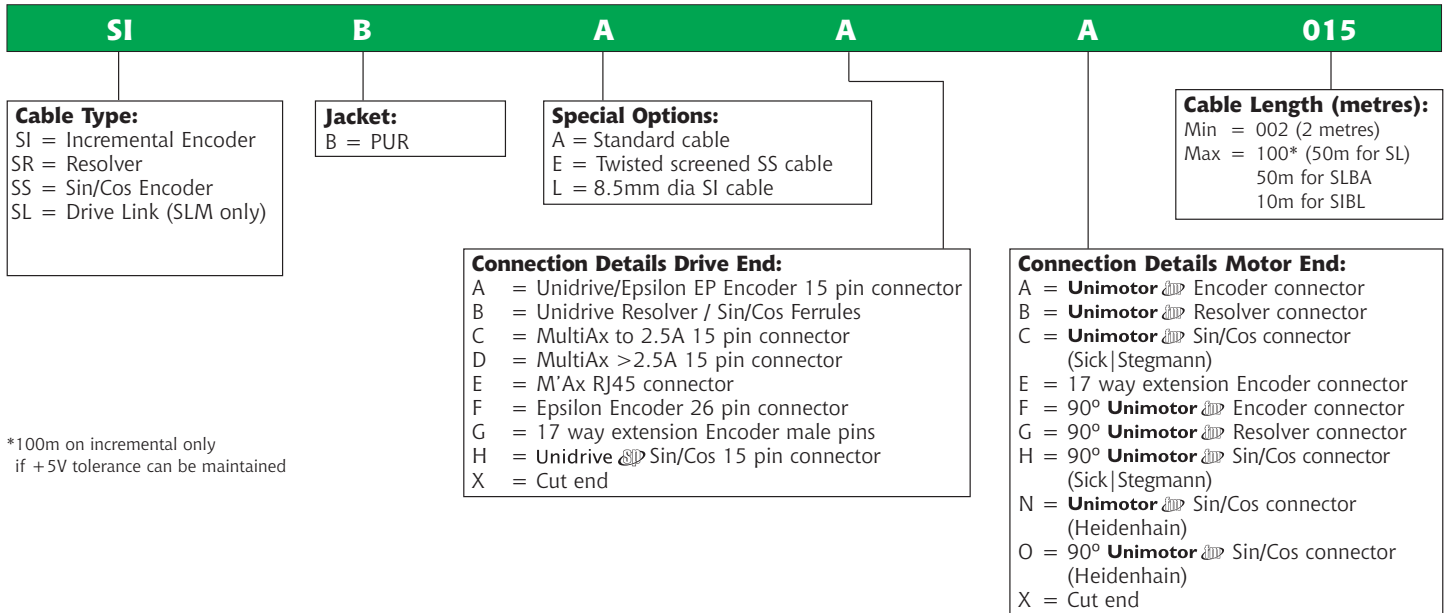
**Jacket** - B is for a PUR sheath and is the standard selection.

**Conductor size** - Select the conductor size according to the motors STALL CURRENT.  
 Cables of 6mm<sup>2</sup> and above will be fitted with ring terminals only.  
 Ratings are for individual cables (not lashed together) in free air temperature up to 40°C - make allowances as appropriate.

**Connection detail drive end** - Select the correct drive end connection for the drive in use.

**Connection detail motor end** - Select the correct motor end connection for the motor in use.

**Length** - Numbers represent the required cable length in metres.



**Cable type** - Choose the cable type to match the feedback device.

**Jacket** - B is for a PUR sheath and is the standard selection.

**Special options** - A is for standard cable. L is for the low cost 8.5mm incremental cable.

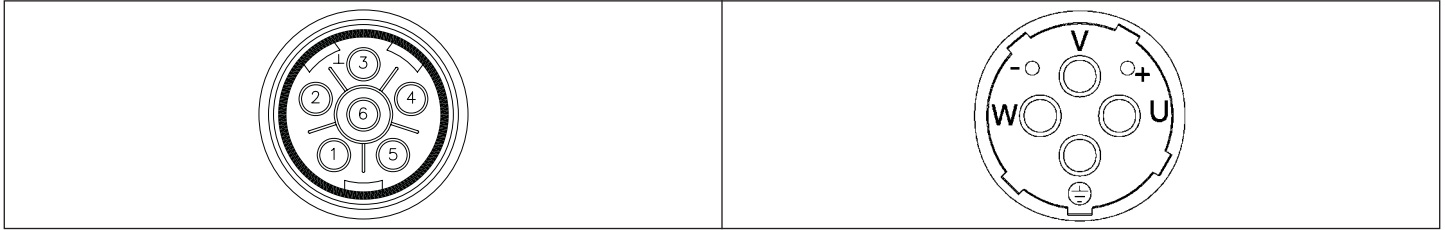
**Connection detail drive end** - Select the correct drive end connection for the drive in use.

**Connection detail motor end** - Select the correct motor end connection for the motor feedback device in use.

**Length** - Numbers represent the required cable length in metres.

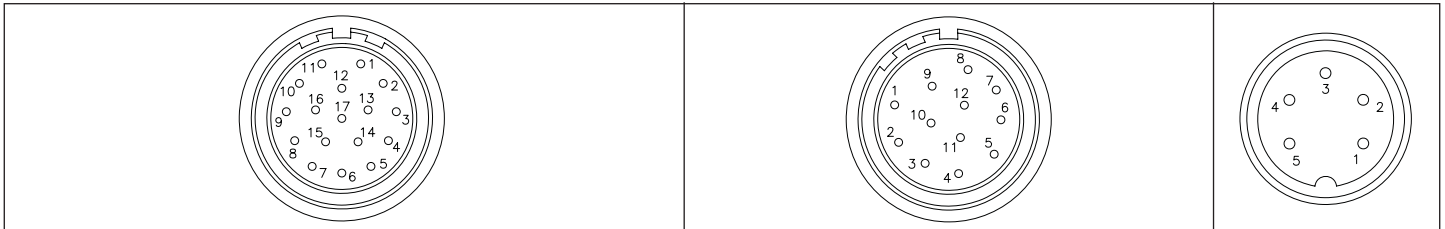
## Motor connector details

### Power Plug



	055-142 with brake	055-142 without brake		190 with brake	190 without brake
Pin	Function	Function	Pin	Function	Function
1	Phase U (R)	Phase U (R)	U	Phase U (R)	Phase U (R)
2	Phase V (S)	Phase V (S)	V	Phase V (S)	Phase V (S)
3	Earth	Earth	Ⓣ	Earth	Earth
4	Phase W (T)	Phase W (T)	W	Phase W (T)	Phase W (T)
5	Brake		+	Brake	
6	Brake		-	Brake	
Shell	Screen	Screen	Shell	Screen	Screen

### Signal Plugs



	Incremental Encoder	Heidenhain Sin/Cos Encoders	Resolver	Sick Stegmann Sin/Cos Encoders	SLM
Pin	Function	Function	Function	Function	Function
1	Thermistor	Thermistor	Excitation high	REF Cos	Comms
2	Thermistor	Thermistor	Excitation low	+ Daten	0V
3		Screen (Optical encoder only)	Cos high	-Daten	+ 24V
4	S1		Cos low	+ Cos	Screen
5	S1 Inverse		Sin high	+ Sin	Comms
6	S2		Sin low	REF Sin	
7	S2 Inverse		Thermistor	Thermistor	
8	S3	+ Clock	Thermistor	Thermistor	
9	S3 Inverse	- Clock		Screen	
10	Channel A	+ Cos		0 Volts	
11	Index	+ Data		-	
12	Index Inverse	- Data		+ Volts	
13	Channel A Inverse	- Cos			
14	Channel B	+ Sin			
15	Channel B Inverse	- Sin			
16	+ 5V	+ 5V			
17	0 Volts	0 Volts			
Body	Screen	Screen		Screen	Screen

## Drive & Application Centres

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Tel: 613 973 81777  
Fax: 613 9729 3200  
After Hours: 61 2 9963 5271

Sydney Drive Centre  
A.C.N. 003 815 281  
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Fax: 61 2 9838 7764  
After Hours: 61 2 9963 5271

### AUSTRIA

Linz Drive Centre  
Tel: 43 7229 789480  
Fax: 43 7229 7894810  
After Hours: 43 7215 3502

### BELGIUM

Brussels Drive Centre  
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### BRAZIL

Emerson do Brazil Ltda  
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### CANADA

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