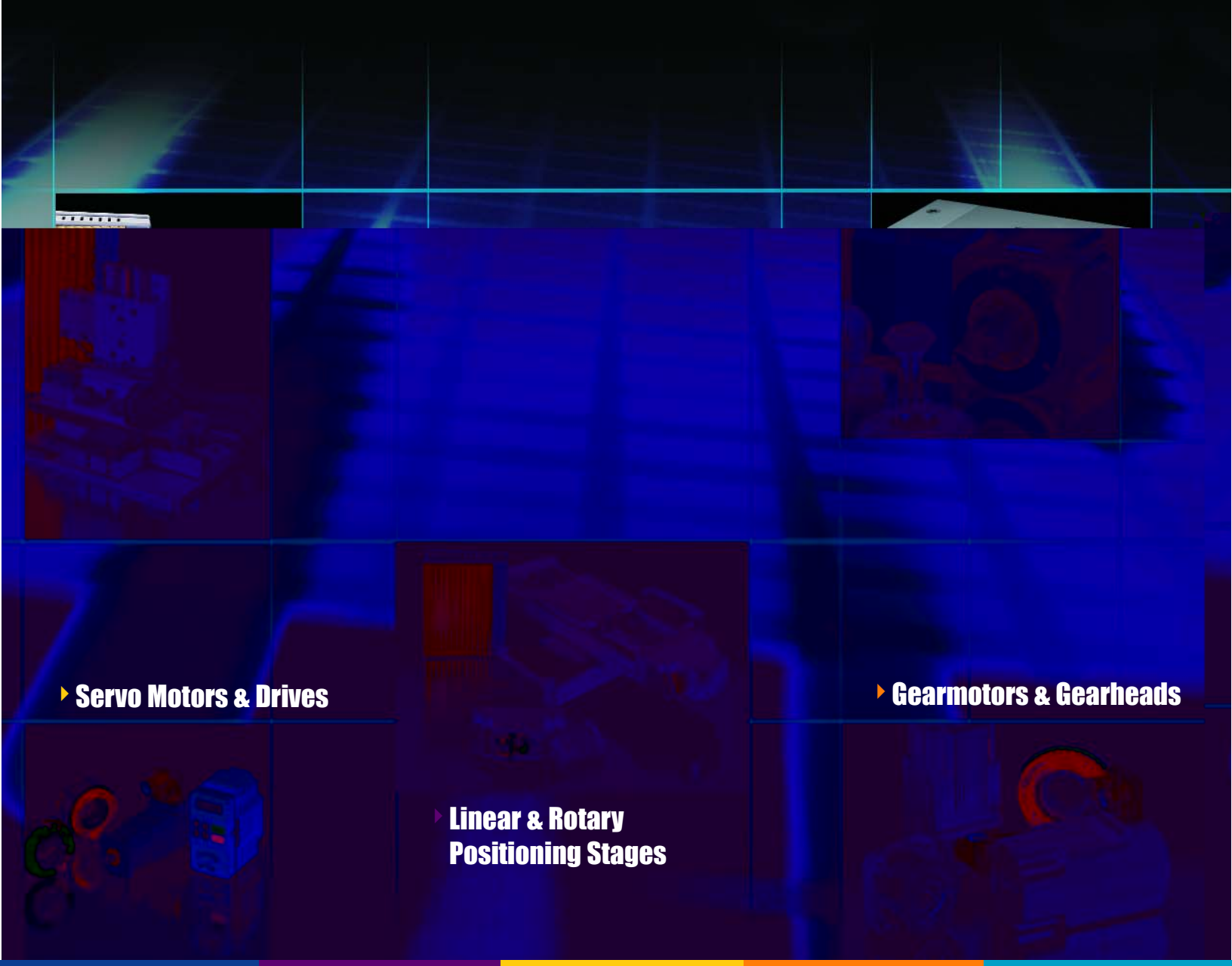


- Servo Motors & Drives
- Gearmotors & Gearheads
- Linear & Rotary Positioning Stages

Direct Drive Rotary Table Product Manual

BAYSIDE Motion Group

PRECISION IN MOTION

BAYSIDE® Motion Group

PRECISION IN MOTION

Direct Drive Rotary Table

Product Manual

Rev: 3.2 / 1103
P/N: 12197009

Please check www.baysidemotion.com for latest revisions.

Product Manual

Direct Drive Rotary Table

Table Of Contents

BAYSIDE MotionGroup
PRECISION IN MOTION

27 Seaview Boulevard * Port Washington, NY 11050 * ☎ 516-484-5353 * Fax: 516-484-5496
www.baysidemotion.com

I. Introduction

Thank you for your purchase of the R Series of direct drive rotary tables. The R Series rotary stages designed to meet the most demanding of automation applications. This manual provides installation and maintenance information for the:

R100D Rotary Stages
R150D Rotary Stages
R200D Rotary Stages

If there are any questions regarding the set up of your product, please feel free to contact Bayside Motion Group, at (516)484-5353 for additional support.

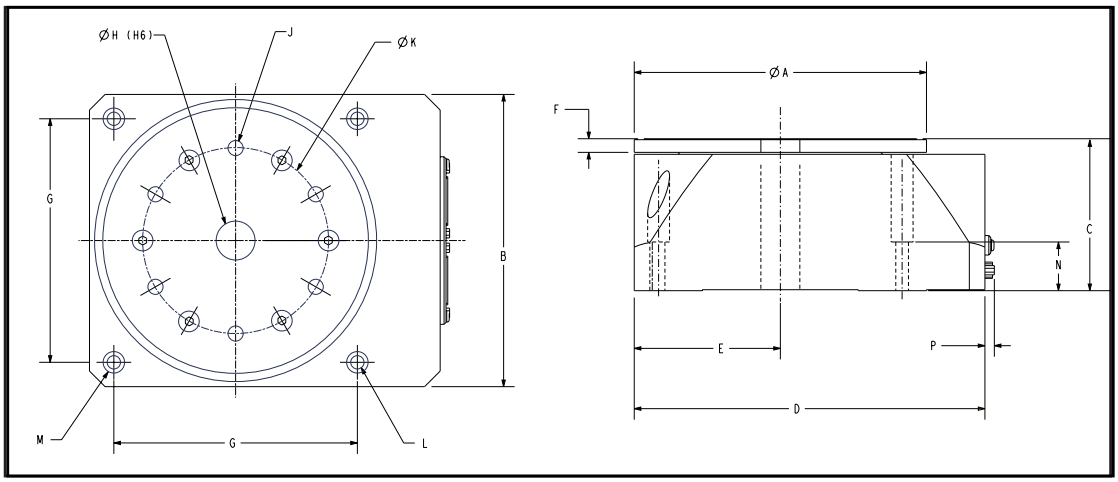
II. Packaging

The stage is packaged in a wooden crate/carton with high density foam padding to avoid any damage during transportation. The assembly is wrapped in plastic to maintain cleanliness and should be handled with appropriate care.

Uncrating
All appropriate stage documentation (including this manual) will be found on top of the stage. The stage can be easily lifted out of the crate/box and placed on a secure surface.

III. Mechanical Specifications

Dimensions



MODEL NO	A	B	C	D	E	F	G	H	J	K	L	M	N	P
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	Tap	(mm)	(mm)	(mm)	(mm)	(mm)
R100D	100	100	75	130	50	5	85	20	M5	60	5.5	9.5	25	5
R150D	150	150	78	180	75	7	125	20	M6	95	6.5	11.2	25	5
R200D	200	200	100	230	100	10	160	30	M8	125	8.5	14.0	25	5

Performance Specifications

Model No.	Axial Capacity		*Perpendicular Capacity @ Radius	Continuous Output Torque		Peak Output Torque		Maximum Output Speed (1)
	(kgf)	(lb)		**(Nm)**	(in lb)	**(Nm)**	(in lb)	(RPM)
R100D	**75**	165.3	20kgf @ 50mm	**0.65**	5.75	**1.96**	17.34	700
R150D	**150**	330.6	75kgf @ 75mm	**4.00**	35.4	**12.00**	106.2	500
R200D	**250**	551.1	150kgf @ 100mm	**6.20**	54.80	**18.6**	164.40	300

*Bearing capacity of a shaft into hole & distance of applied force

(1) Maximum output speed based on 300V bus and may be limited by selected drive frequency limitations

Model No.	Radial Runout @ øH	Axial Runout @ øK	Wobble @ Axis of Rotation	Inertia		Stage Weight	
	(microns)	(microns)	(arc sec)	**(gm cm sec^2)**	(oz in sec^2)	**(kg)**	(lb)
R100D	20	18	60	**14.2**	0.197	**2.2**	4.85
R150D	26	23	45	**86.4**	1.200	**5.8**	12.79
R200D	36	30	30	**338.0**	4.695	**10.5**	23.15

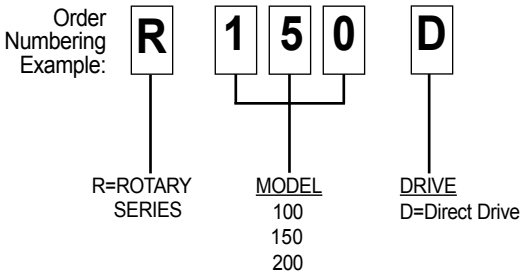
IV. Electrical Specifications

General

The direct drive rotary tables consist of a brushless DC motor, high resolution encoder and load mounting plate assembled on a single shaft and supported by a single set of precision bearings. By eliminating any gearing between the motor and load plate, an extremely stiff assembly is created, with no mechanical backlash or hysteresis, resulting in a high servo performance and wide bandwidth capable unit.

The motor can be driven by any three phase brushless DC servo amplifier capable of supplying the voltage and current shown in the motor specifications.

All I/O signals are available in a single D type connector (see below).



For easy installation, motor power and encoder/Hall cables can be purchased from Bayside Motion Group. To order cables, please contact Bayside Sales Department at 516-484-5353

See cable drawings in appendix for color codes

Cable Options:

Mating Power Cable

Part Number	Length	Used With
10963018	3 meters	Flying Leads/i-Drive
10963067	8 meters	Flying Leads/i-Drive

Mating Sensor Cable

Part Number	Length	Used With
10963241_3000	3 meters	Flying Leads
10963240_3000	3 meters	i-Drive
10963241_8000	8 meters	Flying Leads
10963240_8000	8 meters	i-Drive
10963136(1)		i-Drive / Controller

(1) NOTE: When an external controller is used in a closed loop mode an additional sensor cable, part number 10963136, is required.

Motor Specifications

Model No.	Voltage Constant K_{EL-L} (V/kRPM)	Torque Constant K_{TL-L} (Nm/amp)	Torque Constant K_{TL-L} (in lb/amp)	Resistance R_{L-L} (ohms@ 25°C)	Inductance L_{L-L} (mH)	Thermal Resistance (°C/W)
R100D	75	**0.72**	6.37	59.9	50	2.0
R150D	210	**2**	17.7	11.4	14	2.0
R200D	325	**3.1**	27.4	10.4	21	2.0

Model No.	Rated Voltage (V)	Icont (amps)	Ipeak (amps)	Logic Voltage (1) (V/amp)	Pole Count
R100D	300	0.9	2.72	5 V @ 170 ma	12
R150D	300	2.0	6.0	5 V @ 170 ma	20
R200D	300	2.0	6.0	5 V @ 170 ma	32(2)

Notes:
(1) For i-Drive applications, the logic voltage is supplied by the i-drive when using matching sensor cable.
(2) For i-Drive applications, certain parameters would be specially set based on 16 poles due to 24 pole maximum. Certain user application parameters may require corresponding adjustment due to 32 poles actual.

Temperature

All motor speed/torque curves are based on 25 deg C ambient with a winding temperature of 155 deg C, at stall. Ambient temperatures above 25 deg C will require derating. Consult Bayside Motion Group at (516) 484-5482, ext. 130 for application assistance.

Circumferential Rotary Encoder

The high resolution encoder has a fixed number of counts per revolution and angular resolution is determined per table shown below.

Although to a large extent a function of the closed loop performance of the total system, repeatability of +/-3 counts (+/-6.3 arc sec nominal) is achievable.

Encoder Data

Model No.	R100D	R150D	R200D
Total Number of counts/rev (1)	473,600	629,760	944,000
Frequency at Max Speed (1) (MHz)	5.5	5.2	4.7
Resolution after x4 (arc sec)	2.73	2.05	1.3728
Repeatability after x4 (arc sec) (2)	± 8.4	± 6.15	± 4.1

(1) Post quadrature (includes 10x interpolation and 4x of control)
(2) Typical system repeatability that can be achieved by a closed loop control system.

Commutation

Three commutation signals, derived by digital Hall sensors, are available for Trap Hall or Hall start up commutation techniques.

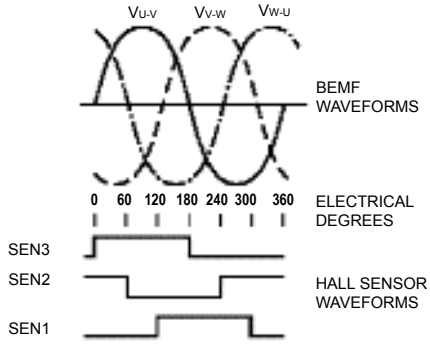
Electrical Characteristics of Hall Sensors

Supply Voltage	5Vdc ± 10%
Output Format	TTL (Internal pull-up resistors provided), 120 degree spacing

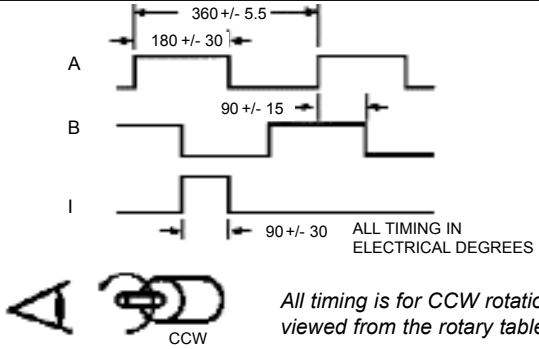
Signal Timing

The following chart shows the timing of the commutation and encoder signals in relation to the motor bemf.

Rotary Motor Signal Timing



Rotary Encoder Timing



All timing is for CCW rotation as viewed from the rotary table.

V. Wiring

Sensor Signal Connector

PIN ASSIGNMENTS
26-Pin "D" Sub-miniature high density

Pin Number	Name	Function
1	/ENCA	Encoder Channel $\overline{A}$
2	ENCA	Encoder Channel A
3	/ENCB	Encoder Channel $\overline{B}$
4	ENCB	Encoder Channel B
5	/INDEX	Encoder Channel $\overline{I}$
6	INDEX	Encoder Channel I
7	+5v	+5VDC Power Supply
8	GND	Ground
9	N/C	Spare
10	N/C	Spare
11	N/C	Spare
12	N/C	Spare
13	N/C	Spare
14	N/C	Spare
15	N/C	Spare
16	N/C	Spare
17	N/C	Spare
18	N/C	Spare
19	SEN 1	Hall Sensor 1 (X)
20	SEN 2	Hall Sensor 2 (Y)
21	SEN 3	Hall Sensor 3 (Z)
22	+5V	+5VDC Power Supply
23	GND	Ground
24	T1	Thermistor
25	T2	Thermistor
26	SHIELD	Shield

POWER CONNECTOR

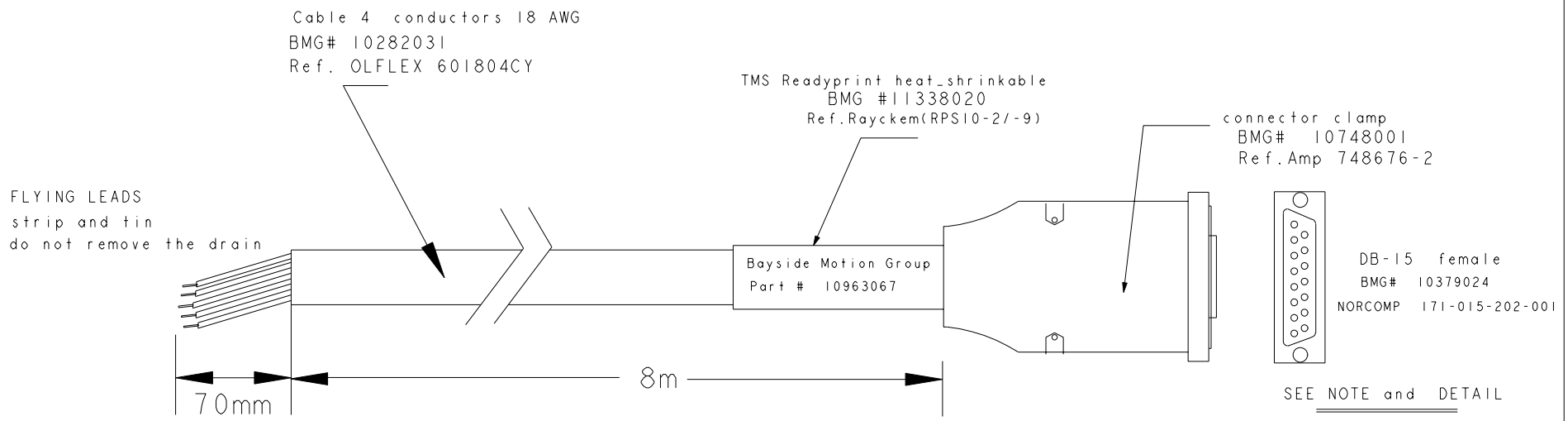
PIN ASSIGNMENTS
15-Pin "D" Sub-miniature

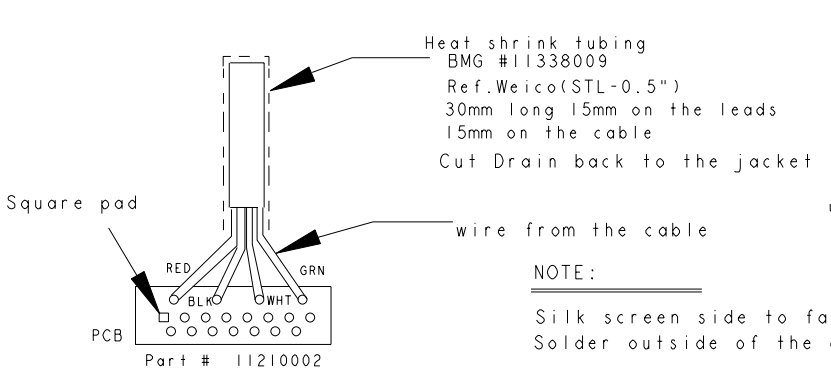
Pin Numbers	Name	Function
1, 2, 9, 10	PHASE U (X)	Motor Power In
3, 4, 11, 12	PHASE V (Y)	Motor Power In
5, 6, 13, 14	PHASE W (Z)	Motor Power In
7, 8, 15	GND	Chassis Ground

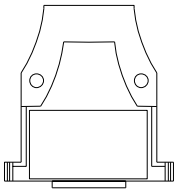
Note: Power for Phases are split over multiple pins.

NOTES

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	09-13-01	A.DAOUD



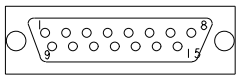




use vinyl electrical tape
to cover the inside wall of
the conn. clamp as shown

NOTE:

Silk screen side to face connector
Solder outside of the connector cuos to PCB



Solder cup side

D-SUB CONNECTOR		WIRES
PIN#	FUNCTION	COLOR&#
1,2,9,10	MOTOR PHASE U(x)	BLACK#1
3,4,11,12	MOTOR PHASE V(y)	BLACK#2
5,6,13,14	MOTOR PHASE W(z)	BLACK#3
7,8,15	GND	GRN/YLW
--	SHIELD	DRAIN

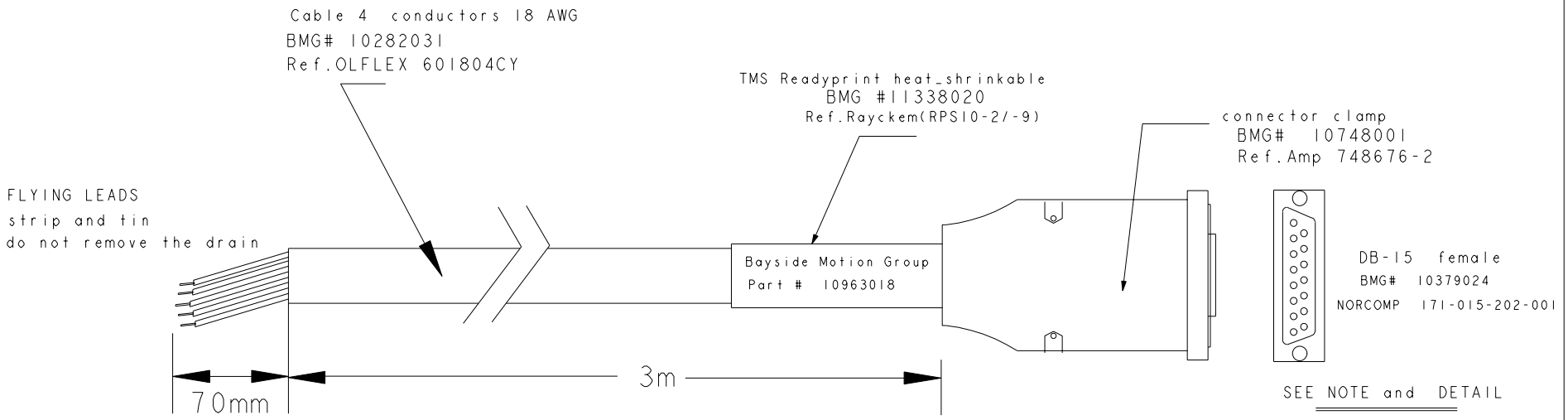
BAYSIDE MOTION GROUP
PORT WASHINGTON, NEW YORK, 11050

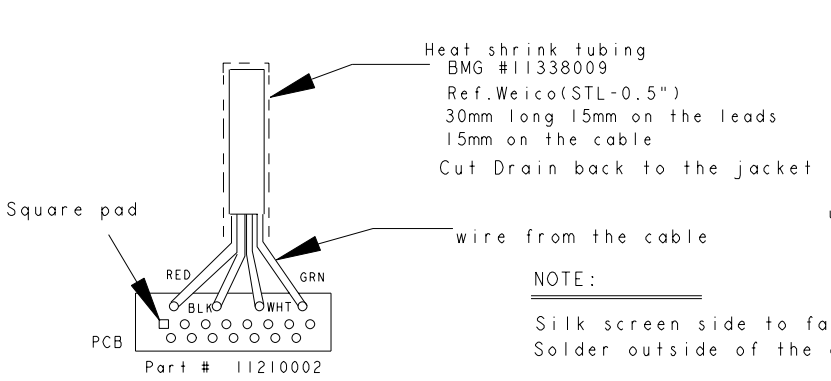
MICRO+ ROTARY POWER CABLE
8m / GENERIC AMP.

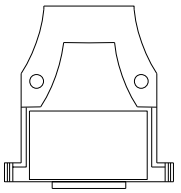
SCALE: NONE		SHEET: 1 OF 1	
SIZE: A	FSCM NO. 96559	DRAWING NO. 10963067	REV. A

NOTES

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	09-13-01	A.DAOUD



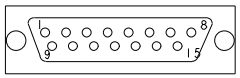




use vinyl electrical tape
to cover the inside wall of
the conn. clamp as shown

NOTE:

Silk screen side to face connector
Solder outside of the connector cuos to PCB



Solder cup side

D-SUB CONNECTOR		WIRES
PIN#	FUNCTION	COLOR&#
1,2,9,10	MOTOR PHASE U(x)	BLACK#1
3,4,11,12	MOTOR PHASE V(y)	BLACK#2
5,6,13,14	MOTOR PHASE W(z)	BLACK#3
7,8,15	GND	GRN/YLW
--	SHIELD	DRAIN

BAYSIDE MOTION GROUP
PORT WASHINGTON, NEW YORK, 11050

MICRO+ ROTARY POWER CABLE
3m /GENERIC AMP.

SCALE: NONE		SHEET: 1 OF 1	
SIZE: A	FSCM NO. 96559	DRAWING NO. 10963018	REV. A

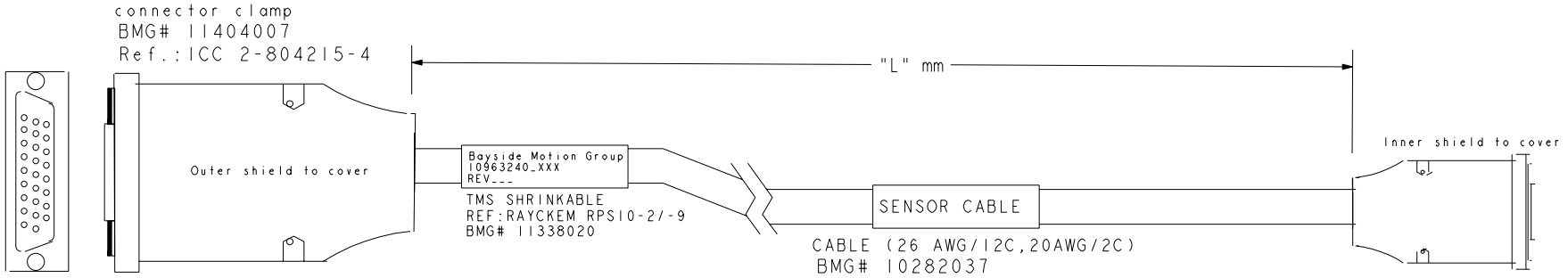
PRODUCTION RELEASE

BY DATE

NOTES

*** IN LINEAR APPLICATION +5V & GND DEFINED ON PIN 22,23 RESPECTIVELY FOR BOTH ENC. AND HALLS

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	ECO 03-664	10/30/2003	R.HALVERSEN



P/N	"L" mm
10963240_8000	8000
10963240_3000	3000

SENSOR			
26PDF	COLOR	FUNCTION	15PDM
1	PINK	ENCA'	9
2	GREEN	ENCA	1
3	YELLOW	ENCB'	10
4	BLUE	ENCB	2
5	RED	INDEX'	13
6	VIOLET	INDEX	5
19	GREY	MTR HALL1 (x)	--
20	BLACK	MTR HALL2 (y)	--
21	ORANGE	MTR HALL3 (z)	--
22	WHITE/20	+5V***	7
23	BROWN/20	GN***	15
24	WHITE	T2(THERMISTOR)	--
25	CLEAR	T1(THERMISTOR)	--
--	DRAIN	SHIELD	--

BAYSIDE MOTION GROUP
PORT WASHINGTON, NEW YORK, 11050

CBL ASSY, RENIS, 3M SEN. CBL ASSY.-
RXXXD TO I_DRV W/O LIM.

SCALE: NONE		SHEET: 1 OF 1	
SIZE: A	FSCM NO. 96559	DRAWING NO. 10963240_XXX	REV. A

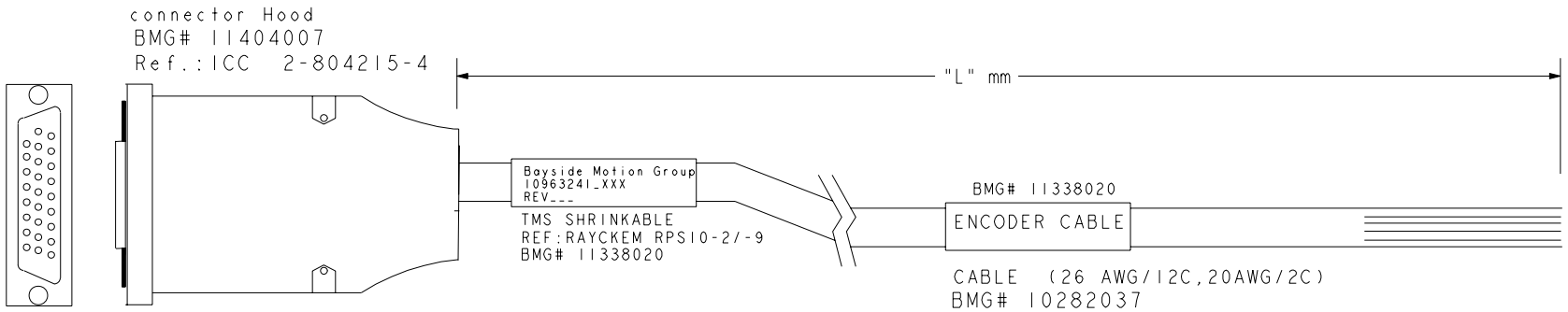
PRODUCTION RELEASE

BY DATE

NOTES

*** IN LINEAR APPLICATION +5V & GND DEFINED ON PIN 22,23 RESPECTIVELY FOR BOTH ENC. AND HALL

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	ECO 03-664	10/30/2003	R.HALVERSEN



P/N	"L" mm
10963241_8000	8000
10963241_3000	3000

ENCODER		
DB PIN#	COLOR	FUNCTION
1	PINK	ENCA'
2	GREEN	ENCA
3	YELLOW	ENCB'
4	BLUE	ENCB
5	RED	INDEX'
6	VIOLT	INDEX
19	GREY	MTR HALL1 (x)
20	BLACK	MTR HALL2 (y)
21	ORANGE	MTR HALL3 (z)
22	WHITE/20	+5V ***
23	BROWN/20	GND ***
24	WHITE	T2(THERMISTOR)
25	CLEAR	T1(THERMISTOR)
--	DRAIN	SHIELD

BAYSIDE MOTION GROUP
PORT WASHINGTON, NEW YORK, 11050

CABLE ASSY, RENISHAW, ROTARY
SEN CBL ASSY./GENERIC AMP.

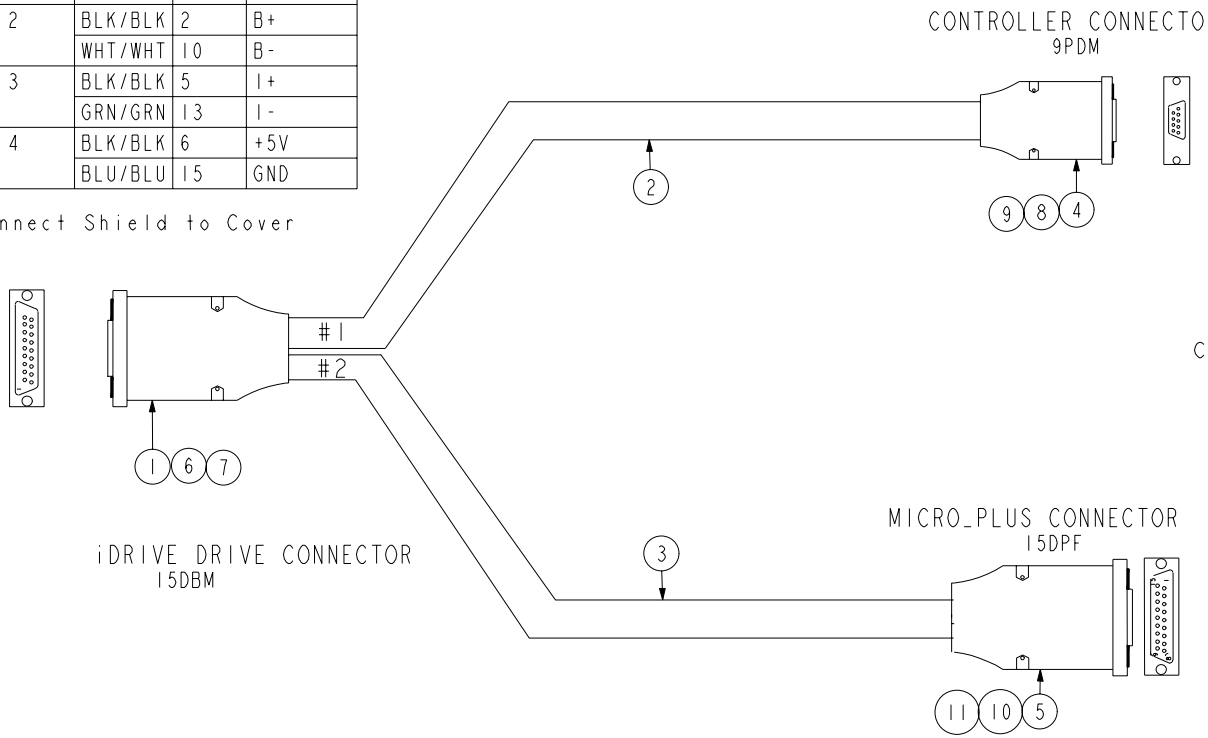
SCALE: NONE		SHEET: 1 OF 1	
SIZE: A	FSCM NO. 96559	DRAWING NO. 10963241_XXX	REV. A

NOTE:
CUSTOMER SUPPLIES +5V AT CONTROLLER CONNECTOR
(5V@300mA)

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	6/3/02	A.DAOUD

CABLE 1,2 PAIR#	CABLE COLOR	15PDM PIN#	SIGNAL FUNCTION
1	BLK/BLK	1	A+
	RED/RED	9	A-
2	BLK/BLK	2	B+
	WHT/WHT	10	B-
3	BLK/BLK	5	1+
	GRN/GRN	13	1-
4	BLK/BLK	6	+5V
	BLU/BLU	15	GND

Connect Shield to Cover



CABLE PAIR#	CABLE COLOR	9PDM PIN#	SIGNAL FUNCTION
1	BLK	1	A+
	RED	6	A-
2	BLK	2	B+
	WHT	7	B-
3	BLK	3	1+
	GRN	8	1-
4	BLK	4	+5V
	BLU	9	GND

Cut and insulate the Shield

CABLE PAIR#	CABLE COLOR	15PDF PIN#	SIGNAL FUNCTION
1	BLK	1	A+
	RED	9	A-
2	BLK	2	B+
	WHT	10	B-
3	BLK	5	1+
	GRN	13	1-
4	BLK	7	+5V
	BLU	15	GND

Cut and insulate the Shield

ITEM	BMG	QTY	DESCRIPTION
1,5	10748001	1	SHELL 15 CONNECTOR CLAMP
6	10379009	1	15PDM CONNECTOR
7,9	10966001	18	DTYPE MALE PIN 22-26AWG
2,3	10282047	2X12"	OLFLEX CABLE 4 TP 26 AWG
4	10748003	1	SHELL 9 CONNECTOR CLAMP
8	10379013	1	9PDM CONNECTOR
10	10379024	1	15PDF CONNECTOR
11	10966002	8	D TYPE FEMALE PIN 22-26AWG

BAYSIDE MOTION GROUP
PORT WASHINGTON, NEW YORK, 11050

IDRIVE/CONTROLLER
SENSOR CABLE ASSEMBLY

SCALE: DRAWING SCALE		SHEET: 1 OF 1	
SIZE: A	FSCM NO. 96559	DRAWING NO. 10963136	REV. A