Cylinder Position Sensors

TECHNOLOGY IN ACTION Stroke-to-GO LEVERLESS LIMIT SWITCH

GO Switch Stroke-to-GO[®] cylinder position sensors use three permanent magnets and push-pull plunger assembly to control a set of dry contacts.

Unoperated

The center magnet simultaneously attracts the primary magnet and repels the bias magnet, pushing the connecting rod backward. As a result, the common contact rests in its unoperated position, closing a contact circuit.

Operated

When the ferrous cushion of a cylinder enters the sensing area of the switch, it attracts the primary magnet, which pulls the connecting rod forward. As a result, the common contact snaps to its operated position, closing the other contact circuit.

When the target is removed the common contact automatically returns to its original unoperated position.



Three magnet design provides **snap action** and solid contact pressure, eliminating 'contact teasing' and 'contact chatter' in high vibration applications.

> Probe lengths ranging from 1" to 5" ensure a proper fit to virtually any cylinder.

> > Permanent magnets never lose of their strength, even when mounted on ferrous metal.

Options Available

- SPST or SPDT
- HiTemp™ to 400°F
- SubSea™ Submersible

Bi-Color red and green LED position indicator increases safety and awareness for plant personnel.

360° rotatable head makes installation simple and easy.

Versatile gold flashed contacts are suitable for high and low electrical loads, and can be wired **AC or DC, N/O or N/C.**

All stainless steel construction makes this **the most durable cylinder position sensor in the world.**

Sensing face is stainless steel

rather than plastic, and is therefore more suitable for high pressure hydraulic cylinder applications.

Key Benefits

Stroke-to-GO cylinder position sensors are simple and built to last.

With only one moving part and no metal-to-metal contact forcing it to move, there is nothing to wear out!

Models 7C, 7D, 7E & 7F



Models 7C, 7D, 7E & 7F

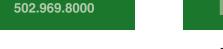
With their solid stainless steel housings and leverless limit switch design, Stroke to GO switches have set the standard for reliability and durability in cylinder position sensing.

Features:

Contact Form

SPDT 4A contacts Inherently Intrinsically Safe -40° to 221°F operating temperature

Options: -40° to 400°F high temperature Quick disconnect connector Underwater capabilities



AST TRACK DELIVERY

SPDT

7C-43658-DCA

1.025" Probe

Mini Connector

7D-43658-DCA

1.250" probe

Mini Connector

7E-43658-DCA

2.062" probe

Outlet Position

Mini Connector

SPST

7C-23658-DCA

1.025" Probe

Mini Connector

7D-23658-DCA

1.250" probe

Mini Connector

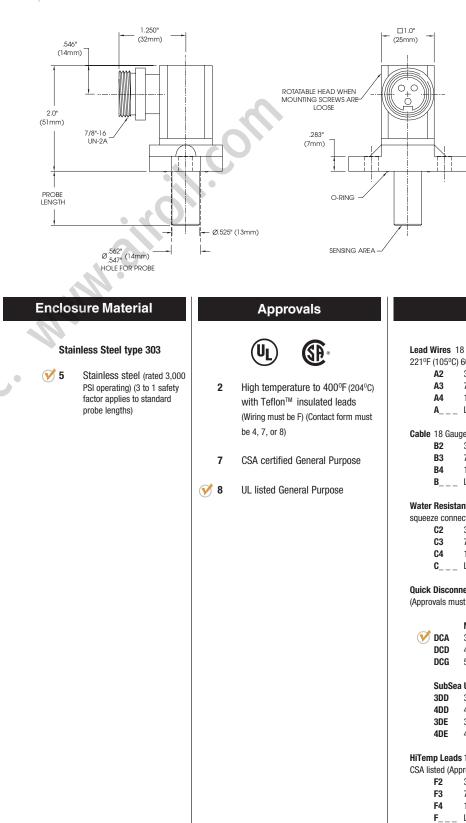
7E-23658-DCA

2.062" probe

Mini Connector

Leverless Limit Switches

Dimensions

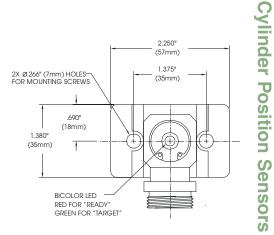


Approvals

 Repeatability: .002" (.05 mm) typical Response Time: 8 milliseconds Differential: Approx. 020" (.51 mm) Operating Temperature: -40° to 160°F (-40° to 71°C) with LEDs -40° to 221°F (-40° to 105°C) without LEDs; HiTemp™ option to 400°F) (204°C) ✓ 7C Model 7C 1.025" (26 mm) probe length ✓ 7D Model 7D 1.250" (32 mm) probe length ✓ 7E Model 7E 2.062" (52 mm) probe length 7F Custom probe lengths 1.000" (26 mm) - 5.000" (127 mm)* *Probe lengths shorter than 1.000" require a taller upper switch housing 	Contact Material: Palladium silver with sawtooth surface configuration Form: SPDT, Form C (with or without LED indication) Single Pole, Single Throw (with or without LED indication) Form A or Form B Ratings: Resistive Material: Ange 120 0.5 24 0.5 140 0.5 1	 Target Material: Ferrous steel Sensing Range: .090" (2.3 mm) end sensing (3,000 PSI) (Recommended air gap .015"040") ✓ 3 Standard sensing - approx090" (2.3 mm) end sensing 	 2 Side entry 360° adjustable (Wiring must be A, B, C, or F) No conduit hub ✓ 6 Side outlet 360° adjustable with Quick Disconnect (Wiring must be D) (Approval must be 7) 7 Side outlet 360° adjustable with ½" NPT conduit hub (Wiring must be A, B, or F) 8 Top outlet (Wiring must be SubSea) 	Stainless Steel type 303 ✓ 5 Stainless steel (rated 3,000 PSI operating) (3 to 1 safety factor applies to standard probe lengths)	2 High with (Wirin be 4, 7 CSA ✓ 8 UL Ii:
Ordering Guide Fill in the boxes to create your 'ordering number.'	 5 Single Pole Double Throw (Form C) (with dual LED's) (Operating voltage: 24 - 240V AC/DC) (No leakage current) 7 Single Pole Single Throw (Form A) N/O output w/o LED indication; No leakage 8 Single Pole Single Throw (Form B) N/C output w/o LED indication; No leakage 		See pp. 93-104 for: Range Extending Target Magnets Mounting Brackets Connectors and more!		
62 Model	Contact Form	Sensing Range	Outlet Position	Enclosure Material	

Sensing Range





	Wiring Options									
F	(105°C)	8 Gauge (.110" dia) potted-in PVC insulated AWM / TEW stranded lead wires, rated at 600V UL / CSA listed 36" (914 mm)								
	A3	72" (1829 mm) 144" (3658 mm)								
	A	Lengths greater than 144" (Specify length in feet (e.g. A150 = 150 ft. of leads))								
	B2 B3 B4	e (.250" dia.) potted-in PVC cable, rated at 176°F (80°C) 300V, UL / CSA listed 36" (914 mm) 72" (1829 mm) 144" (3658 mm) Lengths greater than 144" (Specify length in feet (e.g. B150 = 150 ft. of cable))								
	Resista e conne	nt 18 Gauge (.250" dia.) PVC cable rated at 176°F (80°C) 300V with water-resistant ctor.								
	C3 C4	36" (914 mm) 72" (1829 mm) 144" (3658 mm) Learthe greater then 144" (Specify length in feet (e.g. C150 – 150 ft of coble))								
	U	Lengths greater than 144" (Specify length in feet (e.g. C150 = 150 ft. of cable))								

Quick Disconnect Male Quick Disconnect only, potted-in connector. (CSA requires a case ground) (Approvals must be 7 or 8) Refer to pp. 93-104 for mating cable assemblies and Aura Light Adapters.

Mini-change[®] Micro-change® **DCA** 3 - pin Mini-change[®] type 3 - pin Micro-change® type DBA **DCD** 4 - pin Mini-change[®] type DBD 4 - pin Micro-change® type DCG 5 - pin Mini-change[®] type

SubSea Underwater Connector (Outlet position must be 8)

- 3DD 3 pin, certified not to leak underwater
- 4DD 4 pin, certified not to leak underwater
- **3DE** 3 pin right-angle, certified not to leak underwater
- 4DE 4 pin right-angle, certified not to leak underwater

HiTemp Leads 18 gauge (.070" dia. potted-in Teflon™ insulated leads rated at 482°F (250°C) 600V UL / CSA listed (Approval must be 2, 7, or 8)

- F2 36" (914 mm)
- 72" (1829 mm)
- 144" (3658 mm)
- **F**___ Lengths greater than 144" (Specify length in feet (e.g. F150 = 150 ft. of leads))

Wiring Options

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Models 7C, 7D, 7E & 7F

502.969.8000

Leverless Limit Switches

A two digit code is required for ordering the correct custom probe length. All Application Considerations below must be met. For any discrepancies please consult factory. Please follow these steps:

- 1. Measure dimension A from both ends of your cylinder or retrieve from specification drawings.
- 2. Locate the Min/Max range that dimension A falls within on the Custom Probe Length Chart.
- 3. Locate probe length requirement and Probe Code in the next two Columns to the right.
- 4. Enter the probe code into the corresponding spaces of the Stroke-To-GO® Part Number.

Application Considerations

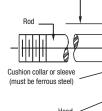
- Cylinder cushion must be ferrous
- Air gap between switch sensing face and cushion should be .015" to .040 (outside this range please consult factory).
- Largest diameter of target (cushion) should cover at least 75% of probe sensing face.
- Sensing face of Stroke-To-GO[®] Switch must be at least .125" from piston rod for proper switch reset. This may at times require an air gap distance greater than .040"
- For cushion diameters less than .50", air gap should be .015" to .025"
- Mounting hardware is 1/4"-20 grade 8 socket head cap screw (included).

7F-		23658-DCA
Custom	Probe	Standard Catalog
Probe	Code	Options

EXAMPLE: If "A" = 2.900" then:

"/	۹"	PROBE	PROBE
MIN	MAX	LENGTH	CODE
2.890	2.915	2.875	J4

indication



2.315 2.340 2.340 2.365 Bi-color LED

1

Dead Center (TDC) of the ferrous cushion.

Distance A may differ at each end.



Cylinder Position Sensors

T troke-To-GO[®] Switches provide precise end-of-stroke position indication on pneumatic and hydraulic cylinders. Designed to exceed automotive industry standards, the housing is machined from stainless steel bar stock to handle pressures to 3,000 PSI operating (tested to UL's 3X burst requirement) while withstanding the extreme external conditions such as weld slag, coolants, cutting fluids, physical abuse and even high temperatures. Stroke-to-GO[®] Switches incorporate the same 70 Series GO[®] Switch mechanism that has been tested to over 200 million mechanical cycles and field proven in the most rigorous applications. This unique design offers the greatest benefits in cylinder indication.

Unique Features

Mechanical life:

>200,000,000 cycles

Leakage current: Without LEDs - none With LEDs - <1mA (SPST)

Voltage Drop:

Without LEDs - none SPDT w/ LEDs - I.0 volt With LEDs - 2.8 volts (SPST)

Temperature drift: none

Washdown: designed to withstand 1,000 PSI washdown and NEMA 6P with Mini-Change® type connector option

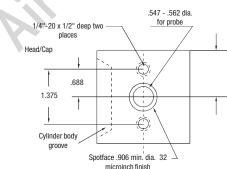
Underwater: rated to 10,000 PSI with deep sea connector option Weld Field Immune: tested and exceeded General Motors EHS-320 specifications. Testing Agency - Candid Logic

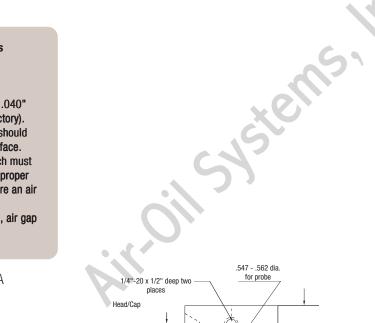
Radio Frequency Interference (RFI): no affect at any frequency

Cylinder cushion must be ferrous.

Application Considerations

- Air gap between switch sensing face and cushion should be .015" to .040" (outside this range please consult factory).
- Largest diameter of target (cushion) should cover at least 75% of probe sensing face. Sensing face of Stroke-To-GO[®] Switch must
- be at least .125" from piston rod for proper switch reset. This may at times require an air gap distance greater than .040".
- For cushion diameters less than .50", air gap should be .015" to .025".







Probe Selection Chart

"A" RANGE

MIN MAX 1.015 1.040

1.065 1.090

1.140 1.165 1.165 1.190

1.190 1.215

1.215 1.240

1.240 1.265

1.315 1.340

1.365 1.390

1.415 1.440

1.515 1.540

1.615 1.640

1.640 1.665 1.665

1.690 1.715 1.715 1.740

1.740 1.765 1.765 1.790

1 790 1 815 1.815 1.840

1.865 1.890

1.915 1.940

1.965 1.990

1 990 2 015

2.015 2.040

2.065 2.090

2.090 2.115 2.115 2.140

2.140 2.165

2 190 2 215

2 240 2 265

2.215 2.240

2.265 2.290

2.315

2.190

2.165

2.290

2 040 2 065

1 865

1.915

1.965

1 840

1.890

1.940

1.465 1.465 1.490 1.490

1.515

1.565

1.690

1 390 1 415

1.340 1.365

1.265

1.290

1.440

1.540 1.565 1.590 1 590 1 615

1.065

1.115 1.115 1.140

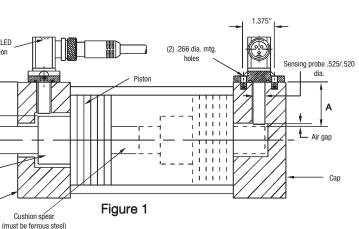
1.290

1.315

1.040

1.090

PROBE	PROBE	"A" RA	NGE	PROBE	PROBE	"A" RA	ANGE	PROBE	PROBE
LENGTH	CODE	MIN	MAX	LENGTH	CODE	MIN	MAX	LENGTH	CODE
1.000	A1	2.365	2.390	2.350	G1	3.715	3.740	3.700	N1
1.025	*	2.390	2.415	2.375	G2	3.740	3.765	3.725	N2
1.050	A3	2.415	2.440	2.400	G3	3.765	3.790	3.750	N3
1.075	A4	2.440	2.465	2.425	G4	3.790	3.815	3.775	N4
1.100	A5	2.465	2.490	2.450	G5	3.815	3.840	3.800	N5
1.125	A6	2.490	2.515	2.475	G6	3.840	3.865	3.825	N6
1.150	A7	2.515	2.540	2.500	G7	3.865	3.890	3.850	N7
1.175	A8	2.540	2.565	2.525	G8	3.890	3.915	3.875	N8
1.200	A9	2.565	2.590	2.550	G9	3.915	3.940	3.900	N9
1.225	B1	2.590	2.615	2.575	H1	3.940	3.965	3.925	P1
1.250	**	2.615	2.640	2.600	H2	3.965	3.990	3.950	P2
1.275	B3	2.640	2.665	2.625	H3	3.990	4.015	3.975	P3
1.300	B4	2.665	2.690	2.650	H4	4.015	4.040	4.000	P4
1.325	B5	2.690	2.715	2.675	H5	4.040	4.065	4.025	P5
1.350	B6	2.715	2.740	2.700	H6	4.065	4.090	4.050	P6
1.375	B7	2.740	2.765	2.725	H7	4.090	4.115	4.075	P7
1.400	B8	2.765	2.790	2.750	H8	4.115	4.140	4.100	P8
1.425	B9	2.790	2.815	2.775	H9	4.140	4.165	4.125	P9
1.450	C1	2.815	2.840	2.800	J1	4.165	4.190	4.150	R1
1.475	C2	2.840	2.865	2.825	J2	4.190	4.215	4.175	R2
1.500	C3	2.865	2.890	2.850	J3	4.215	4.240	4.200	R3
1.525	C4	2.890	2.915	2.875	J4	4.240	4.265	4.225	R4
1.550	C5	2.915	2.940	2.900	J5	4.265	4.290	4.250	R5
1.575	C6	2.940	2.965	2.925	J6	4.290	4.315	4.275	R6
1.600	C7	2.965	2.990	2.950	J7	4.315	4.340	4.300	R7
1.625	C8	2.990	3.015	2.975	J8	4.340	4.365	4.325	R8 R9
1.650 1.675	C9 D1	3.015 3.040	3.040 3.065	3.000 3.025	J9 K1	4.365 4.390	4.390 4.415	4.350 4.375	R9 S1
1.700	D1 D2	3.040	3.005	3.025	K1 K2	4.390	4.415	4.375	S1
1.725	D2	3.000	3.115	3.075	K2 K3	4.440	4.465	4.425	S3
1.750	D3	3.115	3.140	3.100	K3 K4	4.440	4.403	4.423	S4
1.775	D4 D5	3.140	3.140	3.125	K5	4.490	4.515	4.475	S5
1.800	D6	3.165	3.190	3.150	K6	4.515	4.540	4.500	S6
1.825	D7	3.190	3.215	3.175	K7	4.540	4.565	4.525	S7
1.850	D8	3.215	3.240	3.200	K8	4.565	4.590	4.550	S8
1.875	D9	3.240	3.265	3.225	K9	4.590	4.615	4.575	S9
1.900	E1	3.265	3.290	3.250	L1	4.615	4.640	4.600	T1
1.925	E2	3.290	3.315	3.275	L2	4.640	4.665	4.625	T2
1.950	E3	3.315	3.340	3.300	L3	4.665	4.690	4.650	T3
1.975	E4	3.340	3.365	3.325	L4	4.690	4.715	4.675	T4
2.000	E5	3.365	3.390	3.350	L5	4.715	4.740	4.700	T5
2.025	E6	3.390	3.415	3.375	L6	4.740	4.765	4.725	T6
2.050	E7	3.415	3.440	3.400	L7	4.765	4.790	4.750	T7
2.075	E8	3.440	3.465	3.425	L8	4.790	4.815	4.775	T8
2.100	E9	3.465	3.490	3.450	L9	4.815	4.840	4.800	T9
2.125	F1	3.490	3.515	3.475	M1	4.840	4.865	4.825	V1
2.150	F2	3.515	3.540	3.500	M2	4.865	4.890	4.850	V2
2.175	F3	3.540	3.565	3.525	M3	4.890	4.915	4.875	V3
2.200	F4	3.565	3.590	3.550	M4	4.915	4.940	4.900	V4
2.225	F5	3.590	3.615	3.575	M5	4.940	4.965	4.925	V5
2.250	F6	3.615	3.640	3.600	M6	4.965	4.990	4.950	V6
2.275	F7	3.640	3.665	3.625	M7	4.990	5.015	4.975	V7
2.300	F8	3.665	3.690	3.650	M8	5.015	5.040	5.000	V8
2.325	F9	3.690	3.715	3.675	M9				



Cylinder Position Sensors

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Stroke to GO Approvals & Wiring

502.969.8000

Leverless Limit Switches

		Lea	<u>ads</u>
CONTACT FORMS		UL	CSA
2 - SPST	COM	Black	Black
Form A	N/O	Blue	Blue
N/O w/ LED	GND	Green	Green
3 - SPST	COM	Black	Black
Form B	N/C	Red	Red
N/C w/ LED	GND	Green	Green
4 - SPDT Form C No LED	COM N/O N/C GND	Black Blue Red	Black Blue Red Green
5 - SPDT Form C Dual LEDs	COM N/O N/C GND	Black Blue Red	Black Blue Red Green
7 - SPST	COM	Black	Black
Form A	N/O	Blue	Blue
N/O w/o LED	GND	Green	Green
8 - SPST	COM	Black	Black
Form B	N/C	Red	Red
N/O w/o LED	GND	Green	Green

3 Pin Micro Change with or without LED

SPST, Form A, N/O						
PIN 1	GND					
PIN 2	COM					
PIN 3	N/0					
SPST,	Form B, N/C					
PIN 1	GND					
PIN 2	COM					
PIN 3	N/C					
SP	DT, Form C					
PIN 1	COM					
PIN 2	N/C					
PIN 3	N/0					

Agency Approvals

Approvals Termination Options	(2) HiTemp	(7) CSA General Purpose	(8) UL General Purpose
A - Potted PVC Leads		Х	Х
B - Potted PVC Cable		Х	Х
C - Water squeeze connector		Х	Х
D - Quick Disconnect		Х	Х
D - SubSea [™] Connector		Х	Х
F - HiTemp [™] Leads	Х	Х	Х

X = Approvals Available

NEMA Ratings

Models 7C, 7D, 7E, 7F		Non-Ha	zardous		Haza	rdous	
NEMA CLASSES	4	4X	6	6P	7	9	
Potted PVC leads	Х	Х					
Potted PVC cable	Х	Х					
PVC Cable w/ squeeze	Х	Х	Х	Х			5
Quick Disconnect	Х	Х	Х	Х			
SubSea [™] Connector	Х	Х	Х	Х			×C,
HiTemp [™] Teflon leads	х	Х					5
Designed to meet respectiv	ve NEMA	specificati	ons				5



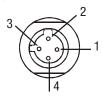
Cal	<u>ble</u>	Water-R	lesistant	<u>HiTemp</u>
UL	CSA	UL	CSA	
Black	Black	Black	Black	N/A
White	White	White	White	
Red	Red	Red	Red	
Black	Black	Black	Black	N/A
Red	Red	Red	Red	
White	White	White	White	
Black White Red	Black White Red Green	Black White Red	Black White Red Green	Black Blue Red
Black White Red	Black White Red Green	Black White Red	Black White Red Green	N/A
Black	Black	Black	Black	Black
White	White	White	White	Blue
Red	Red	Red	Red	Green
Black	Black	Black	Black	Black
Red	Red	Red	Red	Red
White	White	White	White	Green

4 Pin Micro Change with or without LED

SPST,	Form A, N/O
PIN 1	COM
PIN 2	N/0
PIN 3	INACTIVE
PIN 4	GND
SPST,	Form B, N/C
PIN 1	COM
PIN 2	INACTIVE
PIN 3	N/C
PIN 4	GND
SPE	T, Form C
PIN 1	COM
PIN 2	N/0
PIN 3	N/C
PIN 4	GND



Male View

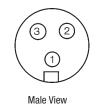


Male View

Stroke to GO Wiring

3 Pin Mini Change with or without LED

SPST, Form A, N/O		
PIN 1	GND	
PIN 2	COM	
PIN 3	N/0	
SPST, Form B, N/C		
PIN 1	GND	
PIN 2	COM	
PIN 3	N/C	
SPDT, Form C		
PIN 1	COM	
PIN 2	N/C	
PIN 3	N/0	



4 Pin Mini Change with or without LED SPST, Form A, N/O PIN 1 PIN 2 PIN 3

PIN	4	GND
SPST, Form B, N/C		
PIN	1	COM
PIN	2	INACTIVE
PIN	3	N/C
PIN	4	GND
SPDT, Form C		
PIN	1	COM
PIN	2	N/0
PIN	3	N/C
PIN	4	GND

COM

N/0

INACTIVE



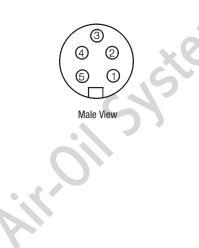
Male View

5 Pin Mini Change

with or without LED

502.969.8000

SPST	, Form A, N/O
PIN 1	N/0
PIN 2	Inactive
PIN 3	GND
PIN 4	Inactive
PIN 5	COM
SPST	, Form B, N/C
PIN 1	Inactive
PIN 2	N/C
PIN 3	GND
PIN 4	Inactive
PIN 5	COM
SP	DT, Form C
PIN 1	N/0
PIN 2	N/C
PIN 3	GND
PIN 4	Inactive
PIN 5	COM
\langle	3
(4)	



Leverless Limit Switches

3 Pin SubSea without LED

Male View

4 Pin SubSea without LED

SPST, Form A, N/O

SPST, Form B, N/C

COM

N/0

INACTIVE GND

COM

N/C

GND

COM

N/0

N/C

GND

SPDT, Form C

INACTIVE

SPS	T, Form A, N/O
PIN 1	COM
PIN 2	N/0
PIN 3	GND
SPS	T, Form B, N/C
PIN 1	COM
PIN 2	N/C
PIN 3	GND
SI	PDT, Form C
PIN 1	N/C
PIN 2	СОМ
PIN 3	N/O
(
	_ Ø /



Male View



3 Pin SubSea - Right Angle without LED

SPST, Form A, N/O			
PIN 1	COM		
PIN 2	N/0		
PIN 3	GND		
SPST, Form B, N/C			
PIN 1	COM		
PIN 2	N/C		
PIN 3	GND		
SPDT, Form C			
PIN 1	COM		
PIN 2	N/0		
PIN 3	N/C		

	00
0	

Male View