Description..

Computer Conversions' Conveyo-Trak™ Series, are stand-alone precision Conveyor Drive Positioners, designed specifically for assembly-line applications. They serve as a reliable means of precisely positioning conveyors in a truly closed loop system that can be either: exactly job/product rate synchronized position (Line Setters), or, absolute position synchronized to any adjacent conveyor (Synchronizers).

Conveyo-Trak™ Systems provide all the functionality of the mechanical/geared Selsyn™ type synchro-chain systems used on assembly line conveyors throughout the automotive industry with the benefits of highly reliable solid state circuitry, added fault detection, a powerful instrumentation readout, and enhanced communication and control features.

Conveyo-Trak™ provide a convenient means for users and O.E.M.s alike to easily facilitate both new and retrofit conveyor controls; with the least amount of start-up time and the greatest level of confidence. Conveyo-Trak® Systems may be hardwired directly into existing cubicles and easily integrated with both relay logic and/or PLC controlled systems.

The Conveyo-Trak™ Controllers are able to receive Selsyn’s™, Resolvers, and/or, both inputs (selectable) into a common chassis. A switch is provided to select which input device; selsyn verses resolver is in use.

Selsyn™ input provisions are provided primarily for retrofit applications, or applications whereby Selsyns™ exist widely in the plant, although newer highly reliable brushless resolvers may be used on newer applications.

*Selsyn is a Trademark of the General Electric Company. All others CCC.
The Resolver Synchronizer is available to receive Selsyn's, Resolvers, and/or, both inputs (selectable) into a common chassis.

A switch is provided to select which input device; selsyn verses resolver is in use.

Selsyn inputs are provided primarily for retrofit applications, or applications whereby selsyns exist widely in the plant although resolvers may be used on newer applications.

For the context of this description, Brushless resolvers are mentioned as the feedback device.

In applications where selsyns are being used or applied, only one field selsyn is required for feedback on each conveyor.

Both field mounted selsyn’s transmitters or selsyn differentials may be used with existing plant wiring.

One or two different Resolver Scope' conveyor controls may be used to make up a given system.

**THE MAIN (INDEPENDENT) CONVEYORS**

*Conveyo-Trak™ Line Setters'*

The line setter receives its position reference signal from a Brushless Resolver mounted on the master Conveyor (any conveyor having independent control).

**Line Setter units** have a thumbwheel adjustable rate timer.

The conveyor position is controlled by the relative position of the line setters command position, to the resolver position input. If their positions differ, the controller produces an error voltage. This error voltage causes the position regulator to correct the voltage to the motors thus eliminating the error.

The resolver position input and the Line Setter’s command position are digitally subtracted and displayed on an LED Readout which shows whether the resolver is lagging (too slow) or leading (too fast) the master timers command position.

The resolver mounted on the line conveyor is digitized, and, used to initialize the rate-position-value. The rate-position-value represents a command position that is continuously subtracted from the absolute resolver-position, to achieve a digital differential. This differential data is converted into a selsyn/synchro format and a DC error voltage for input to the motor drive.

The selsyn/synchro output signal is used to hold the relative position of the master conveyor exactly synchronized with the selected production rate.

The desired number of **product yield per hour is set on the** (Line Setter’s) **5 digit thumbwheel switch**, causing this rate position to increment at exactly the desired position controlled speed.

A 110VAC rate enable input is provided for run/stop control of the rate generator. This emulates a motor-run input to a mechanical motor-driven Selsyn/synchro. When the enable (115VAC-RUN) is activated; the absolute value is incremented by the rate set on the thumbwheels.

**CONVEYORS BEING SYNCHRONIZED**

*Conveyo-Trak™ Synchronizers'*

**Conveyo-Trak Synchronizer units** receive a position reference from a Brushless Resolver mounted on an adjacent conveyor.

The absolute position of the follower conveyor is received from a Brushless Resolver mounted on the follower conveyor.

The resolver on the adjacent conveyor is compared with a brushless resolver on the slave conveyor to precisely synchronize the absolute position of the slave (following) conveyor.

The absolute position of the follower and the adjacent conveyor resolvers are digitized and subtracted from each other to achieve a digital representation of the absolute position difference, between both conveyors.

This “digital differential” is converted into a selsyn/synchro format and appropriate analog format for input to the motor drive. These error output signals are used to hold the relative position of the two conveyors within specified tolerances.

On Synchronizers’ **the Thumbwheel Switch Control** is provided as a precision digital offset, commonly known in older systems as a null setter.

This allows the user to remotely bias the field mounted Selsyn/Resolvers' absolute position relationship between the referenced 'Master', and the following 'Slave' conveyors. Offset adjustments can be incremented or decremented to optimize the position synch.

The true physical "Absolute" position of the conveyors is constantly maintained regardless of any power outage or coasting during the outage to insure there is no cumulative position error in the system.

On all Synchronizer units the adjacent conveyor can be the same resolver that is also used for either a Line Setter, Synchronizer, or a completely independent Selsyn or resolver.

When wired for dual purpose, to change a conveyor’s scope from a “Line Setter” to a “Synchronizer” or vice versa; only the thumbwheel circuit card needs to be exchanged.

Both Line Setters and Synchronizers have the following commonality in their operation, function and components:
Conveyor Position

An reliable Brushless Resolver (or Selsyn) is used to sense and report absolute position of a conveyor within a single job length. The resolvers are geared such that they rotate exactly one revolution per job length.

**Brushless Resolver**

The Brushless Resolver is basically a two stage, air-coupled rotary transformer, having precision shielded ball bearings as the only physical contact between the casing (stator), and the rotary shaft input (rotor).

The transducer biases AC signals used as inputs to the rotor windings; providing outputs that are ratiometrically proportionate to the angular absolute position of the shaft.

Because transformer couplings are used both to excite and retrieve data; slip rings, brushes, or contacts, are neither used or required. Without brushes; brush bounce, misalignment, and wear related problems do not exist, and infinite repeatable feedback can be expected.

The Resolver’s low output impedance, high signal to noise ratio, moderate frequency range, and open winding configuration; facilitates dependable data w/long transducer cable runs in harsh electrical environments.

The low 26VAC signal voltages allow for safer operation by minimizing the amount of high voltage devices physically connected to the conveyor or machine.

CCC offers a large variety of stocked Heavy Duty NEMA rated Brushless Resolvers (available at a fraction of the cost of Selsyn/synchro's).

Also the availability of CCC Explosion-proof Brushless Resolvers allows greater user versatility in paint booth applications. The brushless resolvers use a simple 3 pair shielded cable from the factory floor to the control panel. This cable distance can be run up to 2500 foot lengths. (Belden 8777)

A precision sine wave generator provides a 26VAC source to power the resolver providing outputs that are ratiometrically proportionate to the absolute shaft angle.

High accuracy, **TRANSFORMER ISOLATED** highly stable, ratiometric, reference synthesized, tracking converter digitize the conveyor job spaces into parallel data words having a resolution 65,536 parts over a single job length.

When displayed, the resolver position is scaled appropriately to yield 0 to 359.9° representing the absolute angle/job space, while the "in-synch" displays a +/-179.9° differential.
The Master Timers command position (or the adjacent conveyors absolute resolver position) is digitally compared to (subtracted from) the absolute resolver position to provide an extremely stable and accurate digital error value. The digital error value is displayed and used as control data to the control output stages.

**OUTPUT STAGES**

The digital error value (control data) is used as the primary input to drive the 3-4 different output stages to provide the following control output functions:

**Out of Position Control & Conveyor interlocks:**

Three standard limit switch outputs are provided for:

- Out of Position Control;
- 1) Conveyor Fast (CF-LS) = Leading
- 2) Conveyor Slow (CS-LS) = Lagging
- Maximum Displacement Control;
- 3) Conveyor Mid/New-Cycle (175°-LS) (175° Limit Switch)

The limit switch position values are factory set to their normal settings and may be changed using jumper plug selections in the control box for "tighter/looser, fast, slow, and/or in-synch. control", however they are normally set to operate at fixed values. These LS selections may be programmed differently/application.

When the Resolvers go approximately 15 degrees out of the an ideal perfect position synch.; the 'conveyor fast' or 'conveyor slow' relay (LS-F, LS-S) pick up, lighting its corresponding display, indicating that the conveyor is getting out of range.

Pick up of the limit switch relays LS-F or LS-S, can act to shut down power to the slower conveyor, or one that is adjacent to it respectively. In either case, the faster conveyor is shut down to allow the slow conveyor to catch up. Interlocking varies between conveyors and is a function of the system design determined by the user.

This auto-correction assures the principle that there is no cumulative loss of production.

Because the driven conveyors' position error cumulates during intermittent conveyor halts (Stop for Quality Programs, production line halts, etc.), the conveyor is able to reclaim that conveyor position, thereby re-capturing valuable (otherwise lost) production time for upto 2/3rd's a job space as the application permits.

**Maximum Displacement Control**

The 175 degree limit switch on the Line Setter or Synchronizer drops out when a predetermined error exists. This is normally wired so that it switches the drive to manual operation (typically running on an open-loop speedpot), and ignores the cyclic negative error correction/control. The LS 175 limit position value may be changed with a jumper selection, however, it is normally set to operate at 175 degrees out of position.

**Fault Set and Detection**

All Line Setters’ and Synchronizer units have integral fault sensing circuitry. The fault detection is indicated on the Convey-O-Scope™ Readout, and 115VAC/10 A. relay for system shut down (CRF).

While the whole of the Convey-O-Trak™ System "Control" is based relative to "absolute position relationships"; the fault circuitry on the other hand additionally requires assured desired conveyor "rate relationships" as a independent medium to further concern a "system-wide fault condition".

The "Fault" light is used to detect a system motion fault concerning a operator setting of a fault adjust dial on the front panel. The fault adjust dial is screened from 10 to 200/800 representing job-lengths per hour.

On a Line Setter system the fault adjust setting should correspond to the thumbwheel setting used to program the desired job lengths per hour rate.

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**TB9 Terminal Block Wiring & LS Functions**

As indicated on the LED readout, the Convey-O-Traks' drive outputs will provide motor correction causing the readout to count down from its negative or positive (lagging or leading) error, automatically adjusting itself to zero degrees, indicating neither slow or fast operation. Shipped set: 1A, 2A & 3A
**Fault Set and Detection continued...**

On a Synchronizer this setting should correspond to thumbwheel setting used on its referenced Line Setter, or it can be set by turning the dial while looking at the “fault” indicator light on the front panel.

When adjusting the fault dial by observing the fault light: turn dial until light goes out and stop it somewhere mid range between the cw and the ccw trippings of the fault light. A pushbutton fault override may user configured for making this adjustment. (Usually coarse setting is sufficient)

The motion fault circuitry uses the dial setting to create a rate window depicting the desired speed of the conveyor; it compares this desires speed to the actual speed of the conveyor. When the conveyor is too fast or slow this is indicated on the “fault” light, and the fault relay CRF is opened. Misadjustment of the fault dial will simply cause a fault indication and force the operator to adjust this setting properly. (Standard shown above, 4 Speed Model shown below)

**CONVEYOR TRAK™ SERIES: CONVEYOR POSITIONERS DESCRIPTION/DETAILS**

**DRIVE/CONVEYOR CONTROL OUTPUTS**

**SYNCHRO/SELSYN OUTPUT**

The first analog output stage is a high voltage 60 hertz isolated, high performance, reference powered, digital to synchro converter. (-PB Model # option, included or plug-in)

The Digital to Synchro Converters’ are standard CCC products used mostly on military applications to simulate/emulate synchro/(Selsyn) outputs.

The AC, 60 Hz. 3 wire output is the electrical equivalent of a Selsyn/Synchro Differential Output.

The D-S converts the error value (control data) into a transformer isolated 3 wire synchro (selsyn) format.

Two of these Synchro signal outputs are used into existing motor drive set-ups equipped to facilitate Selsyn™ error signals or Synchro Control Transformer (CT) type inputs.

The Synchro output pair used represents a VAC, 60Hz. signal, whose amplitude is representative of the sine of the angular differences between the command input and the position of the resolver mounted on the conveyor.

The error voltage is as shown in the sine representative figure (below) with the other two wire combinations having voltages in phase and amplitudes off by ±120 degrees (lagging or leading).

This voltage along with the 120VAC reference power is wired into the motor drive, on retrofit type applications, wherein the existing drive controllers are already set-up for Selsyn Error style inputs.

The full 3 - wire format is provided to facilitate unique wiring in certain existing systems.

The digital display indicates the value of the angular error and whether it is leading or lagging, the range of the display is ±179.9 degrees representing an error of ±49.99% of a conveyor job length.

**TB7 & TB9 WIRING: AC DRIVE ERROR (TRIM) OUTPUTS FOR DIRECT RETROFITS.**

Notes: 1) TB7 is used only on retrofit applications [older drive set-ups] requiring the same exact AC Selsyn error signal as the existing set-up uses (-PB model # option).

2) Circuit shown depicts only a simplified electrical simulation of the I/O, to simplify the wiring into retrofit applications previously using Selsyn/Synchro chains similar to that shown.
The Conveyo-Trak's "Run" input is only used on the "Production-Yield Line Setter units", this input is ignored/not used on Synchronizer units.

This "Run" input is what causes the main line conveyors internal synthesized position rotator (the rotating reference/command angle) to start/stop rotating at exactly the production rate set on the "Product-Yield/Hour" thumbwheels. If this input remains active during conveyor halts the error cumulates during the halt, and the conveyor will automatically recapture the lost position when the conveyor is again allowed to run.

The user defines application of the Limit Switch outputs: CS-LS (SLOW), CF-LS (FAST), and the 175°-LS(New-Cycle) functions, determine how much conveyor position may be reasonably reclaimed whereby; the conveyor will be able to successfully recapture the position synch. If the

The Sine (S1-S3) signal of the Brushless Resolver itself best reflects the continuous smoothness of signal provided as the drive control 'error' (trim) command output, and the aggressive coupling towards a zero null.

The fault output relay CRF, and "In-Synch" Limit Switch outputs CS-LS and CF-LS; are used to validate to the drive control logic that the Conveyor is being synchronized, and indeed "in-Synch." while performing more critical operations. The DC error voltage output may also be used into chart recorders and DVM's; to compliment maintenance, diagnostic and statistical process concerns.

Drive cannot successfully recapture the position synch. either because; a) there is not enough of the job-space remaining to confidently assure a lock, b) the acceleration is set too slow on the drive, or, c) application concerns such as certain paint operations may not as easily tolerate moderate mid-cycle accelerations; then the user can have the logic wired to smoothly "roll-over", skip the job space, and instead concentrate on assuring a new/next cycle position synch.
THE CONVEY-O-SCOPE™ READOUT

The Conveyo-Trak™ Readout is a human engineered instrument that allows you to instantly see exactly what’s going on inside the conveyor, inside the control, and between conveyor and its reference or adjacent conveyor.

The Conveyo-Trak™ Readout allows the user to see the position of the conveyor, monitor the smoothness of motion, and the continuous positional lead/lag synchronization between the conveyor and its reference.

The readout has a two position push switch labeled "Position" and "In-Synch". When depressed in the 'position mode' it displays the absolute position of the conveyor as 0 to 359.9 degrees representing 0 to 99.99% of a job length, (better put 360 degrees represents one job length, or job space).

When the display switch is depressed in the synch mode it displays the position error as 0 to +/-179.9 degrees, representing a resolver lagging or leading 0 to +/-99.99% of a job length.

Additional LED's are provided to indicate conveyor 'fast', and 'slow', limits, and while approaching a 180° limit cross (175° limit output).

The Conveyo-Trak™ Readouts retrofit into any existing rotating 'Synchro-dial' door panels without any modification...

CONVEY-O-SCOPE™ READOUT

OUTLINE & MOUNTING

Note: CCC Readout mounts w/ 2 10-32 Screws Tapped .5" Deep

CUBICLE DOOR CUT-OUTS NEED NOT BE CHANGED FOR RETROFITS (EXACT).
It uses brilliant .56" H LED characters under a polarized filter lens, for excellent contrast under any ambient light conditions. A simple snub-nose toggle switch is provided to switch between the “position tracking” and the “synchronized tracking” display modes of the conveyor.

All the information is provided real-time with crisp solidly discernable numeric values that are inherently translated to the cyclic and continuous nature of the conveyor.

The Resolver-Scope™ Readout enables maintenance personnel to be instantly and intimately familiar with the internal going ons of the conveyor and its control, allowing them to more rapidly diagnose most any conveyor related problem.

--- MODEL NUMBERS: CONVEY-O-SCOPE™ READOUT:
P/N : RSRD-4.5D-DFP

READOUT CABLE:
(PRE-WIRED, TO J1) P/N : RSRDC-10 = 10' Long
P/N : RSRDC-20 = 20' Long

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PLC DATA BUS INTERFACE (J2)

Though not required; the same information shown on the Conveyo-Trak™ Readout is made equally available real-time, to a high speed PLC compatible data output port, allowing the PLC to perform any desired additional automation, diagnostics, and continuously track the conveyor position.

The PLC data-port may be used to perform parts tracking and other automation related tasks based on the absolute position and/or synchronization of the conveyor, or the absolute position relative to a proximity switch of any other type of sensor input that may be mounted over the conveyor, skid, part, or product running.

A significant feature of the conveyor position data provided is that it is true absolute position feedback, that the PLC knows exactly where the conveyor is regardless of power outages, coasting, or movement during the power down.

The Standard Data Output Ports Provide BCD Data representing: the absolute position of the conveyor being controlled, the differential or out of synch. position, and status bits

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**CCC RESOLVER WIRING (TB2 & TB4)**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>H</th>
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<tbody>
<tr>
<td>S4</td>
<td>S2</td>
<td>S1</td>
<td>S3</td>
<td>S1</td>
<td>S2</td>
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**WIRING SELSYN™ INPUTS (TB3 & TB5)**

<table>
<thead>
<tr>
<th>TB3</th>
<th>TB5</th>
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<tr>
<td>RL</td>
<td>RH</td>
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<tr>
<td>S1</td>
<td>S2</td>
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<td>S2</td>
<td>S1</td>
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<tr>
<td>S3</td>
<td>S3</td>
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</table>

**TARGET/FOLLOWER REFERENCE SELSYN SELSYN/SYNCHRO-IN /SYNCHRO-IN.**

Reverse S1 w/S3 to change direction of rotation.

**USING EXISTING SELSYN™/SYNCHRO DIFFERENTIALS (RETROFITS ONLY)**

**AUX. EXCITATION TO DRIVE SELSYN DIFFERENTIALS -DT OPTION/PLUG-IN**

**TO REFERENCE SYNCHRO-IN (TB3)**

OR, TARGET SYNCHRO-IN (TB5) (as req.d.)

**Note:** TB10 is used only when a field mounted Differential Selsyn need be wired/used as the conveyor position feedback sensor.
PLC DATA BUS INTERFACE continued ... representing the fault, conveyor fast, slow, and 175 degree limit functions.

The data port is PLC compatible for discreet I/O using BCD data, it may be also configured for very high resolution 16 Bit binary position, and conveyor differential error, data. Standard proven CCC watchdog-timer styled data synchronizing I/O control facilities have been provided to assure that the PLC receive good, stable valid data words, every PLC I/O scan. Data select control lines are provided to minimize the amount of discreet I/O data lines to the PLC.

**Optional Serial Data/Networking Port:** (J3)

Reserved for Serial RS485 communications, fibre optic and other future network fieldbus type interface options, limit functions etc.... Plug-in card, facilities provided on all units.

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**OUTLINE DRAWING & TERMINATIONS:** (Same For All Units, Setters’ & Synchronizers')

<table>
<thead>
<tr>
<th>J1, CONVEY-O-SCOPE™ Readout Port</th>
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**Diagram Description:**

- **TB6 110VAC POWER INPUT**
- **.281 Dia. SLOT 1/4-20 Thru, 2 Places**
- **Hole Centers:** 10"w. x 14.5"h.
SPEED POT ALTERNATIVES:
Both users and system integrator's, especially when planning newer applications; will often ask and consider "do I really need a speed-pot?".
The answer is "No", a speed-pot is not required, but considering conveyor safety concerns: it's basic, simple, a good back-up, and it's been working for many years.
A DC output from a PLC (or other types) could and can be used, and in addition to that you'd probably want a coarse speed-pot to back-up at least that aspect of the PLC anyway. Plant managers are not tolerant of conveyors not running.
A very advantageous benifit of using Convey-O-Trak™ systems is that they cannot actually shutdown the conveyor; they can only activate a fault, shut themselves out of the loop, forcing the speed-pot to take control of the conveyor, at the coarser rate, or as the user logic is employed: cause an orderly halt no worse then any innitiated by an operator.

On Synchronizer applications, and while performing more critical position related tasks; the Convey-O-Traks™ Conveyor Fast/Slow (CF-LS & CS-LS), the /175° LS, and fault (CRF) relay outputs are commonly employed within the user logic to validate and interlock the operation of the more critical tasks being performed.
The wiring of Convey-O-Traks™ into motor drive cubicles, is best when commonality is employed. The wiring differences between "Main Line Setters" being used on either "independent or lead" conveyors, verses "Synchronizers" being used on "electronically chained" conveyors is identical.
The only difference is wether one or two sensors (either of existing Selsyns™ or Brushless Resolvers) are wired into the Convey-O-Trak™ Controller.
In this way a user may easily change the scope or task of the driven conveyor between: being independent, a lead conveyor, or a tied following position synchronized conveyor, and; even change which conveyor it is following, with ease.
Additionally, by using a speed-pot it is very easy to diagnose any drive system problems, simply switching out the Convey-O-Trak and running off the speedpot momentarily, makes it very easy to assure at least where the source is not.

BRUSHLESS RESOLVERS:
Heavy Duty Nema 12
Brushless Resolver use
CCC P/N HR90-11GT
add: -K for keyed shaft,
-RA for right angle connector port.

HR90-11GTKRA

Heavy Duty Brushless
Explosion-Proof Resolver
(UL labelled) use
CCC P/N HX90-11GT

---

MODEL SELECTION GUIDE:
Base Model: Prefix CT for CONVEY-O-TRAK™;

\[
\text{CT} \quad \text{ML} \quad \text{DCS} \quad \text{W} \\
\]
Add:

Base Control Type:
-ML : For Main Line Setter (plug-in PCB)
---- or ----- PS : For Position Synchronizer (Plug-inPCB)

Add:

AC/DC Drive Control Format (plug-in PCBs)
-DCS : For standard pre-set on newer drives
-DCA : For +/-10VDC control trim/follower, (includes gain & zero adjustability)
-PB : High Voltage Selsyn error type AC control outputs, (plug-in module), primarily used for Selsyn retrofits.

Others Available Consult Factory
For optional PLC Data Interface
-W : BCD 5V. TTL PLC I/O (most common)
-WB : Binary 5V. TTL PLC I/O
-485 : RS422/RS485 Serial Interface
-FX : Fieldbus & other Serial Data Format, X= Serial/fieldbus type, consult factory.
For Retrofits using Selsyn Differentials

~~~~~~~~~~~~~~Notes:~~~~~~~~~~~~~~
1) Model shown is most common for newer drives.
2) All units accept both Selsyn &/or Resolver inputs.
3) For highly reliable brushless resolvers see CCC: GT Series &/or Ex-Proof Transducer Data sheets.
4) All units shipped pre-assembled/tested whole.
5) Model: RSM7-4LC-DS60P = CT-ML-DCS-W
Model: RSM7-4LC-DS60PW = CT-ML-PB-DT
6) Multiples of options may be selected or added/unit.
7) Order Convey-O-Scope™ Readout seperately .
8) To order options as seperate circuit items prefix P/N: CTPC-X, where X = an option code above.

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BRUSHLESS RESOLVERS:

heavy duty nema 12
brushless resolver use
ccc p/n hr90-11gt
add: -k for keyed shaft,
-ra for right angle connector port.

---

Model: RSM7-4LC-DS60P = CT-ML-DCS-W
Model: RSM7-4LC-DS60PW = CT-ML-PB-DT

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CONVEY-O-SCOPE™ READOUT
P/N : RSRD-4.5D-DFP

CONVEY-O-SCOPE™ READOUT CABLE
(PRE-WIRED TO J1) P/N : RSRDC-10 = 10' Long
P/N : RSRDC-20 = 20' Long

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CONVEY-O-TRAK™ SERIES
APPLICATION DETAIL: DRIVING
TYPICAL AC/DC MOTOR DRIVE

Rev-1 7-5-98 Terms 17 & 18
reversed on slave cube

MAIN CUBE
J10- Pos. 2-3
TB-2
28
TB-1
7 1 8 1 7
TB-4
TB-1
10 6 1 1 9
Min Speed
Pot R89

STANDBY CUBE
J10- Pos. 2-3
TB-2
28
TB-1
7 1 8 1 7
TB-4
TB-1
8 0 6 1 1 9
Min Speed
Pot R89

Digital Resolver-Scope
Terminations w/ Regen. DC
Mot. Drv. A/B 1370 AR/IR
A6320-1