



Product Information

DYNA Products

Pow-R-Con™



DYN2-94025-001



DYN2-94026-001

GENERAL

The Barber-Colman Pow-R-Con™ represents an integrated approach to isochronous load sharing, auto-synchronizing, load managing and measurement/annunciation. This approach allows a single module to incorporate four functions. The Pow-R-Con is compatible with Ambac, Barber-Colman, Cummins (GCS), Detroit Diesel (DDEC), Governors America Corporation, Heinzmann, John Deere (Power Tech 12.5L), MTU (MDEC), Scania (DEC2), and Woodward governor systems. This versatile module allows the user to have one standard wiring installation for all of the above systems. The user interface is accomplished via either an LCD display and programming panel integrated into the Pow-R-Con or a laptop computer.

PART NUMBERS

- DYN2-94025-001 (module with display and programming panel)
- DYN2-94026-001 (module without display and programming panel)
- DYNK-55100 (display and programming panel)
- DYNA 29900 (includes both DYN2-94026-001 and DYNK-55100)

STANDARD FUNCTIONS

Display and Programming Panel

- Integral or Remote Mounting of Display and Programming Panel
- Automatic Syncro-Scope Display Function During Synchronizing
- Measured True RMS Digital Display for L-L and L-N Voltage, Phase Current, Frequency, Kilowatts, KVAR and Power Factor
- If display and programming panel is not ordered, programming and display is via laptop computer

Isochronous Load Sharing

- Built-In Paralleling Relay
- Adjustable Droop
- Forward Power On, Forward Power Off, Reverse Power Relay and LED Indication
- Forward Power On and Off Adjustable Time Delay and Level Including LED Indication
- Adjustable Load Pulse Sensitivity (Potentiometer)
- Remote Adjustable Governor Speed Set
- Keypad Entered Full Load Bridge Voltage, PT and CT Ratios

Auto-Synchronizing

- Adjustable Breaker Closing Angle Window for Phase, Frequency, and Voltage Match
- Adjustable Stability and Phase Gain
- LED Indicators for Sync Enable and Unmatched Voltage, Frequency and Phase
- Voltage Match Relay Output Control

Load Managing

- Individually Adjustable 5 Seconds to 5 Minutes Up/Down Electronic Ramps
- Adjustable Low and High Power Limit
- Remote Adjustable Power Level (Keypad or Potentiometer)
- Individual Load Control
- Adjustable Breaker Trip Limit
- LED Indication - High and Low Limit, Command Mode, Blend Mode, Load Generator, Unload Generator, Breaker Trip

SPECIFICATIONS

 * and  Rated

AC Voltage Input: 3 Phase, 50 or 60 Hz, 120-480 VAC $\pm 15\%$

DC Voltage Input: 18-28 VDC

Current Input: 3 Phase, 5 Amperes per phase at maximum generator load. 1.25 VA burden per phase on each current transformer at 5.0 A.

Load Sharing (Accuracy): Adjustable to $\pm 0.5\%$ between sets of equal size at full load.

Outputs (Dependent on Load Gain Adjustment):

1. Paralleling Line: 1.5 - 4.5 VDC at full load (programmable).
2. Speed Setting Signal - Compatible with Barber-Colman DYN1 controllers with remote speed set, Cummins, DDEC, GAC, Heinzmann and Woodward governors.
3. Breaker Close Relay Contacts - Normally Open, 10 Amperes Resistive at 240 VAC.
4. Breaker Trip Relay Contacts - Normally Open, 10 Amperes Resistive at 240 VAC.
5. Forward Power On Relay Contacts - Normally Open, 5 Amperes Resistive at 120 VAC.
6. Forward Power Off Relay Contacts - Normally Open, 5 Amperes Resistive at 120 VAC.

7. Reverse Power Relay Contacts - Normally Open, 5 Amperes Resistive at 120 VAC.
8. Voltage Increase/Decrease Relays - Normally Open, 5 Amperes Resistive at 120 VAC.
9. Forward and Reverse Power Monitor Output - Adjustable Offset and Span With Nominal 4-20 mA (Meter 200 Ohm Maximum).

Ambient Operating Temperature:

DYN2 94025: -20° to 55° C* (-4° to 131° F)

**55° C is for Display Only*

DYN2 94026: -20° to 70° C (-4° to 158° F)

Enclosure: The Pow-R-Con module is one assembly, unless the remote mount display and programming panel is utilized. The main control unit cover is a sturdy non-conductive plastic secured to the unit mounting plate with four screws.

Mounting: Attitude at any position, but consideration of the display orientation should be considered.

Circuit Board: Environmentally protected by conformal coating.

Weight: 1.45 kg. (3.2 lbs.)

Vibration: Withstands the following vibration without failure or degraded performance: 0.06 inch double amplitude at 5 to 18 Hz; 1 G at 18 to 30 Hz; 0.02 inch double amplitude at 30 to 48 Hz; 2.5 Gs at 48 to 70 Hz.

Shock: Withstands 15 Gs in each of three mutually perpendicular axes.

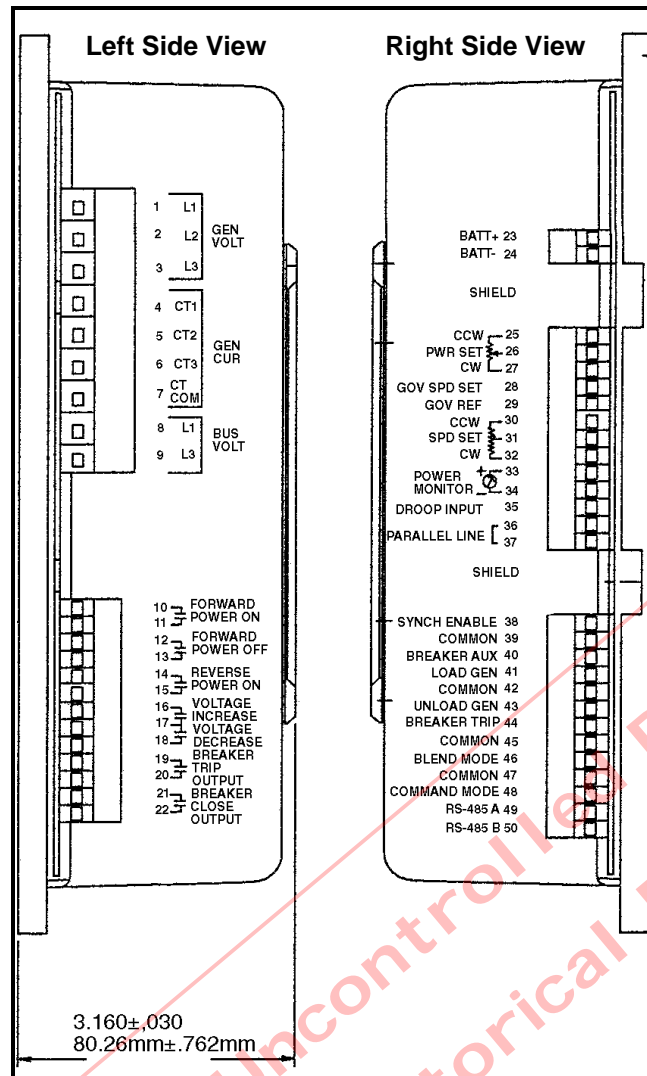
TYPICAL APPLICATIONS

which require any of the following:

- Isochronous load sharing between two or more generator sets.
- Single or multiple unit peak shaving applications.
- Droop load sharing when paralleling with an infinite bus.
- Reverse or forward power output contact signals.
- Analog signal for power monitoring of a system.
- Improvement of off-speed transient response by using the load pulse feature.
- Automatic synchronization with generators operated isochronously.
- Automatic synchronization with generators operated in droop.
- Automatic synchronization with an infinite bus.
- Automatic synchronization with another AC 50/60 Hz power source to allow bumpless transfer.
- Single unit isochronous paralleling to utility.
- Bumpless/breakless transfer of multiple generator sets.

*approval is pending

INSTALLATION DIMENSIONS



OPERATION

Auto-Synchronizer

The synchronization function monitors voltage, frequency and phase of the generator and the bus. Speed input to the governor is controlled to bring these parameters within the adjustable ranges for synchronism. The synchronizer's capture range is ± 2.0 generator Hz.

In automatic mode, the engine speed and voltage adjust relay are controlled to bring the genset into synch. The breaker close output contact is closed when the voltage, phase and frequency of the generator are within the following adjustable windows:

- Frequency difference - within ± 0.1 Hz ± 0.25 Hz
- Phase difference - within ± 2 to ± 20 degrees for 50/60 Hz
- RMS Voltage difference - within $\pm 1\%$ to $\pm 15\%$

Load Ramp

The load ramp controls the output of the generator. Two modes of operation for the load ramping function are the BLEND and COMMAND mode. When neither of these inputs are selected, the load ramping function is disabled.

In the blend mode, after the generator breaker is closed, the generator output is held at the low limit. Upon receiving a ramp up signal, the generator is ramped up to proportionally balance the system load. The load sharing lines are then connected to the system load sharing lines and proportional load sharing is continued. On the contrary, if the generators are in a state of normal load sharing and a ramp down input is provided, the system paralleling lines are disconnected and the generator load ramped down to the low limit. Upon reaching the breaker trip point, a receipt of a trip signal at the generator trip input causes the breaker trip relay to energize and take the generator off line. Ramp up and down rates are adjustable independently from 5 seconds to 5 minutes.

In the command mode, the generator output is held at its current level until a ramp up or down input is received. Ramping up or down varies the load carried by the generator between the adjustable low limit and the command level set. A high limit can be set to limit the amount of generator output beyond which any further ramp input will have no effect.

Isochronous Load Sharing

The load sharing function of this controller computes total generator power from three phase voltage and current sensing. The generator's output is compared to the paralleling lines and fueling changes are made to maintain proportional load sharing while maintaining a fixed frequency on an isolated bus.

Power Measurement

Measurement of real power (KW), reactive power (KVAR), power factor, (true RMS Phase-Phase and Phase-N) voltage and current magnitudes is accomplished via the display panel.

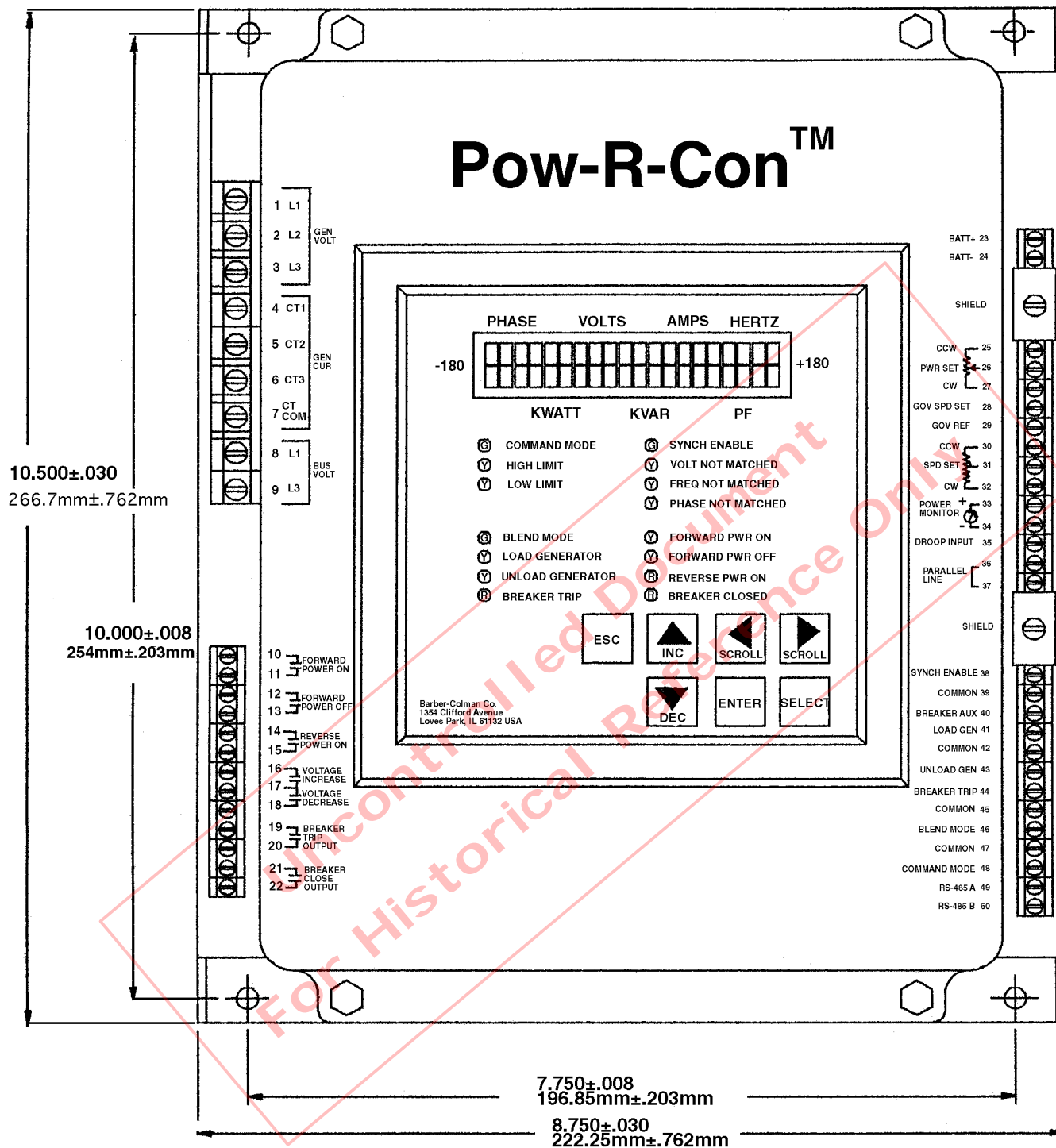
— NOTE —

Barber-Colman believes that all information provided herein is correct and reliable and reserves the right to update at any time. Barber-Colman does not assume any responsibility for its use unless otherwise expressly undertaken.

— CAUTION —

As a safety measure, the engine should be equipped with an independent overspeed shutdown device in the event of failure which may render the governor inoperative.

INSTALLATION DIMENSIONS



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