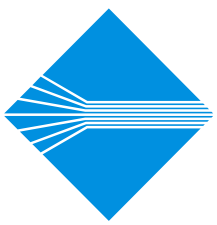
Micro II DeviceNet For Rev#4.1

Installation, Operation, and Troubleshooting Manual



BENSHAW
ADVANCED CONTROLS & DRIVES

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Revision History

Revision	Date	ECO#	Description of Changes
00	9/18/2000	164	Initial release.
01	1/31/2001		Changed the Major Revision of the Identity object to 2 and gave range for Minor Revision.
			Changed the minimum Rated Speed of the Motor Data Object to 1.
		212	Added TruTorque decel as an option for Stop Mode of Softstart Object.
		212	Added fault code 151 for TruTorque current limit.
		212	Added 4 TruTorque attributes to the Softstart Object.
		212	Changed the Data Type of Starting Torque and Max Torque of the Softstart Object to UINT.
		219	Added the parameter DN:Rev to the Comm. Settings menu.
			Updated Table 19 to include new fault codes.
02	7/18/2001	E064	Converted OL from tabled classed 5,10,15,20,25,30,NA,BYP to 0-40, 0 = OFF, 1-40 = Class
03	11/26/2002	E0504	Added an overload warning condition to the cause of the Warning bit in the Control Supervisor object.
			Added kw control as a start mode in the Softstart object.

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1. Introduction

The RediStart Micro II has built in DeviceNet capabilities, allowing it to be connected to and controlled over a DeviceNet network. Many of the starter parameters and commands are available through DeviceNet. The EDS file (electronic data sheet) may be obtained by contacting Benshaw or from Benshaw's web site at www.benshaw.com.

DeviceNet FEATURES			
Device Type	Softstart Starter	Master/Scanner	N
Explicit Peer to Peer Messaging	N	I/O Slave Messaging	
I/O Peer to Peer Messaging	N	• Bit Strobe	N
Configuration Consistency Value	N	• Polling	Y
Faulted Node Recovery	N	• Cyclic	N
Baud Rates	125K, 250K, 500K	• Change of State (COS)	N

1.1 Default I/O Messages Content

The following is the default content of I/O messages. For other available I/O messages, see section 3.4.

Default Input Message (Assembly Instance 61)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
At Reference			Ready		Running	Warning	Faulted

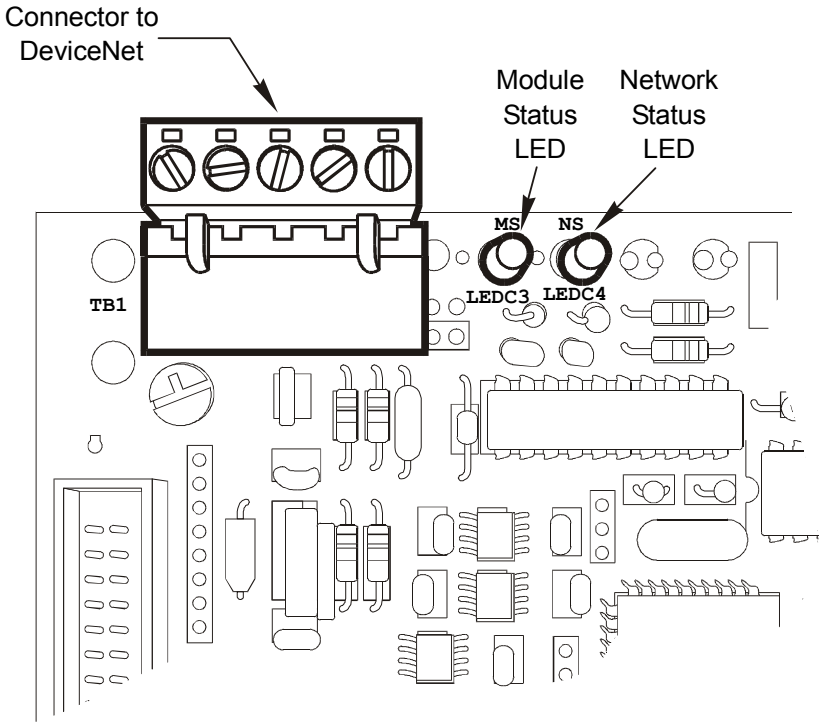
Default Output Message (Assembly Instance 100)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
			RM#2	RM#1	Fault Reset		Run

2. Connecting to DeviceNet

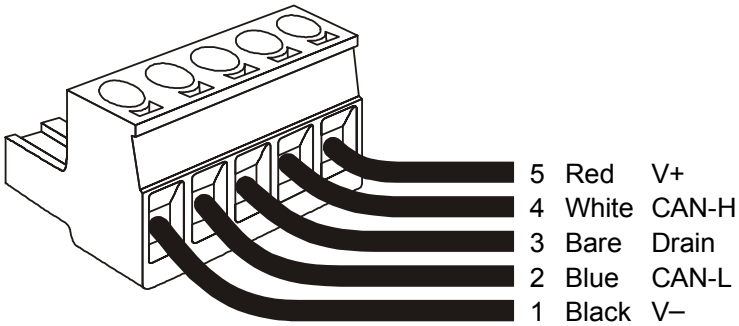
2.1 Card Layout

The DeviceNet connector and indicator LEDs are located in the upper, left-hand corner of the CPU card.



2.2 Wiring the Connector

Wire the DeviceNet connector as shown.



2.3 Parameter Configuration

The following parameters need to be configured properly before using DeviceNet. Note that the starter must be reset for any changes to these parameters to take effect. All of the parameters are located in the Micro II menu; Main Menu\Control Config\Comm. Settings.

Parameter	Value
COMM. Mode	Select DNet.
DN:MAC ID	Enter the DeviceNet MAC ID. (0 to 63)
DN:Baud	Select 125, 250 or 500 kBPS.
DN:InAssy	Select the assembly instance for the desired input data format. See section 3.4 for a list of assemblies and their formats.
DN:OutAssy	Select the assembly instance for the desired output data format. See section 3.4 for a list of assemblies and their formats.
DN:T/O Act	Select “none” or “stop”. This selects what action the starter takes in the event that the DeviceNet connection times out. If “stop” is selected and the starter is running, it will stop.
DN:Rev	Displays the revision of the DeviceNet interface as it is stored in the Identity Object. It is displayed in the form Major.Minor revision.

3. Device Profile

The Micro II starter implements the Softstart device profile (0x17).

3.1 Object Model

The following objects are implemented and may be accessed.

3.2 Identity Object

Class Code: 0x01 (one instance)

Table 1 – Identity Object Instance Attributes

Attribute ID	Name	Access	Data Type	Description
1	Vendor ID	Get	UINT	This will have a value of 605
2	Device Type	Get	UINT	This will have a value of 0x17 (Softstart)
3	Product Code	Get	UINT	This will have a value of 0x01
4	Revision	Get		
	Major Revision		USINT	2
	Minor Revision		USINT	1 – 255
5	Status	Get	WORD	See Table 2
6	Serial Number	Get	UDINT	A unique 32-bit serial number
7	Product Name	Get	SHORT STRING	RediStart Micro II

Attribute ID	Name	Access	Data Type	Description
8	State	Get	USINT	1 – Device is testing battery RAM 3 – Device is operational. Note that the device can be operational even if the starter detects faults (e.g. current imbalance). 4 – Major Recoverable Fault. There was a problem with the battery RAM. To recover, send a type 1 reset service (see below) or reset from CPU card. 5 – Major Unrecoverable Fault. There was a problem with the keypad. The starter must be serviced.

Table 2 – Bit Definitions for Status Instance Attribute of Identity Object

Bit(s)	Name	Definition
0	Owned	Indicates that the drive has been allocated to a master
1 – 9		Reserved
10	Major Recoverable Fault	Caused by corrupted battery RAM
11	Major Unrecoverable Fault	Caused by keypad failure
12 – 15		Reserved

Table 3 – Identity Object Services

Service Code	Supported		Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x05	No	Yes	Reset

The reset service can only be executed while the starter is stopped. Two types of reset are supported. A type 0 reset has the same effect as pressing the computer reset switch on the Micro II CPU card. A type 1 reset will reset the starter to a default state. A type 1 reset will result in all parameters being set back to their defaults. The Watt-hour meter, running time meter, number of starts and RTD peak meters will be reset to 0. The event log will be cleared. The system password will be cleared. The DeviceNet configuration parameters in the Communications Settings menu will not be changed, however. Once everything has been set to it's default state, the starter will then reset as if the computer reset switch on the Micro II CPU card were pressed.

3.3 DeviceNet Object

Class Code: 0x03 (one instance)

Table 4 – DeviceNet Object Instance Attributes

Attribute ID	Name	Access	Data Type	Description
1	MAC ID	Get/Set	USINT	Node Address – range of 0 to 63. Note: Setting is only allowed while the starter is stopped.
2	Baud Rate	Get/Set	USINT	0 – 125 kbps 1 – 250 kbps 2 – 500 kbps Note: Change does not take effect until after the starter is reset.
3	BOI	Get	BOOL	Bus-Off interrupt = 0 The starter must be manually reset if it becomes Bus-Off.
4	Bus-Off Counter	Get	USINT	Number of times it became Bus-Off.
5	Allocation Information	Get		
	Allocation Choice Byte		BYTE	1 – Explicit Message 2 – Polled I/O
	Master's MAC ID		USINT	
6	MAC ID Switch Changed	Get	BOOL	This is set to 1 when the MAC ID is changed through the keypad. It is reset to 0 after the starter is reset and the change takes effect.
7	Baud Rate Switch Changed	Get	BOOL	This is set to 1 when the Baud Rate is changed through the keypad. It is reset to 0 after the starter is reset and the change takes effect.
8	MAC ID Switch Value	Get	USINT	This is the value of the MAC ID as it is set by the keypad.
9	Baud Rate Switch Value	Get	USINT	This is the value of the Baud Rate as it is set by the keypad.

Table 5 – DeviceNet Object Services

Service Code	Supported		Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single
0x4B	No	Yes	Allocate_Master/Slave_Connection_Set
0x4C	No	Yes	Release_Group_2_Identifier_Set

3.4 Assembly Object

Class Code: 0x04 (ten instances)

All Input and Output assemblies consist of one byte.

Table 6 – Assembly Object Instance Attributes

Attribute ID	Name	Access	Description
3	Data	Get/Set	See Table 7 and.Table 8

Table 7 – Output Assembly Data Attribute Format

Instance	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	Basic Contactor								Run
2	Basic Overload						Fault Reset		
3	Basic Motor Starter						Fault Reset		Run
100	Benshaw Starter				RM#2	RM#1	Fault Reset		Run

Table 8 – Input Assembly Data Attribute Format

Instance	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
50	Basic Overload								Faulted
51	Extended Overload							Warning	Faulted
52	Basic Motor Starter						Running		Faulted
53	Extended Motor Starter				Ready		Running	Warning	Faulted
60	Basic Soft Start	At Reference					Running		Faulted
61	Extended Soft Start	At Reference			Ready		Running	Warning	Faulted

Table 9 – Mapping Output Assembly Data Attribute Components

Data Component Name	Class		Attribute	
	Name	Number	Name	Number
Run	Control Supervisor	0x29	Run	3
Fault Reset	Control Supervisor	0x29	FaultRst	12
RM#1	Discrete Output 1	0x09	Value	3
RM#2	Discrete Output 2	0x09	Value	3

Table 10 – Mapping Input Assembly Data Attribute Components

Data Component Name	Class		Attribute	
	Name	Number	Name	Number
Faulted	Control Supervisor	0x29	Faulted	10
Warning	Control Supervisor	0x29	Warning	11
Running	Control Supervisor	0x29	Running	7
Ready	Control Supervisor	0x29	Ready	9
At Reference	Soft Start	0x2D	At Reference	3

Table 11 – Assembly Object Services

Service Code	Supported		Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

3.5 Connection Object

Class Code: 0x05

Table 12 – Connection Instance IDs

Connection Instance ID	Description
1	Explicit Messaging Connection into the server.
2	Poll I/O Connection
3	Bit-Strobe I/O Connection (not supported)
4	Change of State of Cyclic I/O Connection (not supported)

3.6 Motor Data Object

Class Code: 0x28 (one instance)

Table 13 – Motor Data Object Instance Attributes

Attribute ID	Name	Access	Data Type	Description
3	Motor Type	Get/Set	USINT	Valid values are: 0 – Non-standard motor 3 – PM synchronous motor 4 – FC synchronous motor 6 – Wound rotor induction motor 7 – Squirrel cage induction motor
4	CatNumber	Get/Set	SHORT STRING	Motor manufacturer's catalog number (nameplate number) 32 characters maximum
5	Manufacturer	Get/Set	SHORT STRING	Manufacturer's name 32 characters maximum
6	FLA	Get/Set	INT	Motor nameplate full load Amps Units: 100mA
7	Rated Voltage	Get/Set	UINT	Motor nameplate rated base voltage Units: V
15	Rated Speed	Get/Set	UINT	Motor nameplate rated speed 1 – 3600 RPM
19	Service Factor	Get/Set	USINT	Motor nameplate service factor 100% – 199%

Table 14 – Motor Data Object Services

Service Code	Supported		Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

The FLA (Attribute 6) corresponds to the FLA parameter that is set through the keypad. Refer to the starter manual for details of how it affects starter behavior.

The Rated Speed (Attribute 15) corresponds to the Motor RPM that is set through the keypad (for tachometer feedback systems). Refer to the starter manual for details of how it affects starter behavior.

The Service Factor (Attribute 19) corresponds to the service factor that is set through the keypad. Refer to the starter manual for details of how it affects starter behavior.

The other attributes are provided solely as an internal database of other motor nameplate information and do not affect the behavior of the starter.

3.7 Overload Object

Class Code: 0x2C (one instance)

Table 15 – Overload Object Instance Attributes

Attribute ID	Name	Access	Data Type	Description
3	FLA	Get/Set	INT	Motor nameplate full load Amps Units: 100mA
4	Class	Get/Set	USINT	Overload Class. Valid values are 0 - 40 and 0 for no overload calculation. If the class is set to BYP, this attribute will report the class as 10.
5	Average Current	Get	UINT	Average of the three phase currents Units: 100mA
6	% Phase Imbalance	Get	USINT	Current phase imbalance calculated as: $\frac{100 \times \max[(max\_curr - avg\_curr), (avg\_curr - min\_curr)]}{avg\_curr}$
7	% Thermal	Get	USINT	% Thermal Capacity (Overload content)
8	L1 Current	Get	UINT	Line 1 current Units: 100mA
9	L2 Current	Get	UINT	Line 2 current Units: 100mA
10	L3 Current	Get	UINT	Line 3 current Units: 100mA
12	Ground Current	Get	INT	Ground fault current Units: 100mA
100	Trip Enable	Get/Set	BOOL	Enables or disables overload tripping at 100% Thermal Capacity 0 – Disabled 1 – Enabled

Attribute ID	Name	Access	Data Type	Description
101	State	Get	USINT	State of the overload protection 0 – Okay 1 – Warning 2 – Full 3 – Lockout with Warning 4 – Lockout 5 – Trip Latched
102	Low Speed FLA	Get/Set	INT	Motor nameplate full load Amps for the low speed winding Units: 100mA
103	Starts without Overload	Get	UINT	Number of starts while overload is set to 0 (NA)
104	Overload Trips	Get	UINT	Number of times the starter has tripped due to overload
105	Emergency Resets	Get	UINT	Number of times an emergency reset has been performed on the starter

Table 16 – Overload Object Services

Service Code	Supported		Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single
0x32	No	Yes	Reset_Overload_Trip

The Class (Attribute 4) defines the number of seconds for the thermal capacity to go from 0 to 100% while the current is at 600% of FLA. Valid values for the class are 0 – 40, & BYP. To select NA from DeviceNet, set the Class to 0. BYP can not be selected by DeviceNet. It can only be selected by the keypad. If BYP is selected, the Class will be reported as 10.

When the Class is set to NA, the thermal capacity remains at 0%. When the Class is set to BYP, the thermal capacity is limited to 90% while the starter is ramping and continues with a class 10 calculation once the motor is up to speed.

The behavior of the starter when the thermal capacity reaches 100% can be programmed by Trip Enable (Attribute 100). Valid values for the Trip Enable are 0 (Disabled) and 1 (Enabled). If the trip is enabled, the starter will stop the motor when the thermal capacity reaches 100% and the State (Attribute 101) will be "Lockout with Warning". Starts will be prohibited until the thermal capacity "cools" to below 60%. Once below 60%, the State will be "Trip Latched" and the overload must be reset in order for starts to be allowed again. Service code 0x32 (Reset_Overload_Trip) may be used to perform this reset. (Pressing the thermal trip reset button on the Micro II CPU card will do the same thing, or the starter can be configured with jumpers to perform an automatic overload reset). The Reset_Overload_Trip service

simply allows starts to occur. It does not change the thermal capacity. This service is only available while the State is "Trip Latched". Otherwise, an "Object State Conflict" error (error code 0x06) will be returned.

The Trip Enable (Attribute 100) corresponds to setting the Overload Lock Fault Class through the keypad. The options available on the keypad are "Critical" and "Disabled".

The following diagram provides a graphical description of the States (Attribute 101) and State transitions.

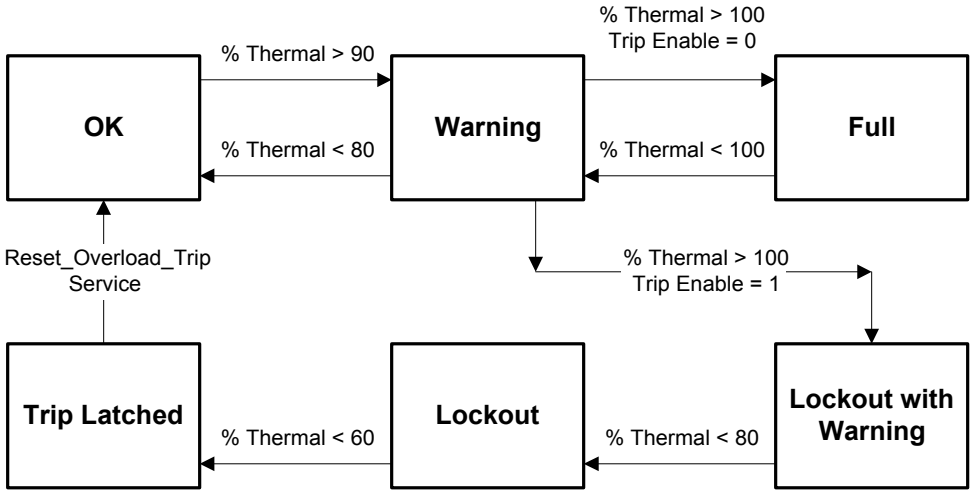


Figure 1 - Overload Protection State Machine

3.8 Control Supervisor Object

Class Code: 0x29 (one instance)

Table 17 – Control Supervisor Object Instance Attributes

Attribute ID	Name	Access	Data Type	Description
3	Run	Get/Set	BOOL	0 →1: Run 1 →0: Stop
6	State	Get	USINT	2 – Not_Ready 3 – Ready 4 – Enabled 5 – Stopping 6 – Fault_Stop 7 – Faulted
7	Running	Get	BOOL	1 – Enabled or Stopping or Fault Stop 0 – Not Ready or Ready or Faulted
9	Ready	Get	BOOL	1 – Ready or Enabled or Stopping 0 – Other states

Attribute ID	Name	Access	Data Type	Description
10	Faulted	Get	BOOL	1 – Faulted Occurred (latched) 0 – No Faults present
11	Warning	Get	BOOL	1 – Warning (not latched) 0 – No Warnings preset
12	FaultRst	Get/Set	BOOL	0 →1: Fault Reset
13	FaultCode	Get	UINT	Code for the most recent fault. See the Fault Code table in this section.
16	DNFaultMode	Get/Set	USINT	Action on loss of DeviceNet communications 1 – none 2 – stop

Table 18 – Control Supervisor Object Services

Service Code	Supported		Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single
0x05	No	Yes	Reset

In order for the Run command (Attribute 3) to work, a relay programmed as RM_R must be fed into the start input in the micro. If the optional relay card is installed, Optional Relay 4 is pre-programmed as an RM_R relay. Note that it is possible to wire the starter such that both the local Start and Stop buttons work simultaneously with the DeviceNet Run command. Be aware that the DeviceNet command to Start or Stop only occurs on the transition of the Run command from 0 to 1 (Start) or from 1 to 0 (Stop). A situation could occur where DeviceNet must toggle the Run command in order for the command to take affect. For example, if the starter was started by a transition from 0 to 1 of the Run command and was subsequently stopped by the local stop button; then in order for DeviceNet to start the starter again, it must toggle the Run command to 0 and back to 1 again. DeviceNet can determine when this situation occurs by monitoring the Running status (Attribute 7) which always reflects whether or not the starter is running regardless of the source of the Start or Stop command.

The following diagram provides a graphical description of the States (Attribute 6) and the State Transitions.

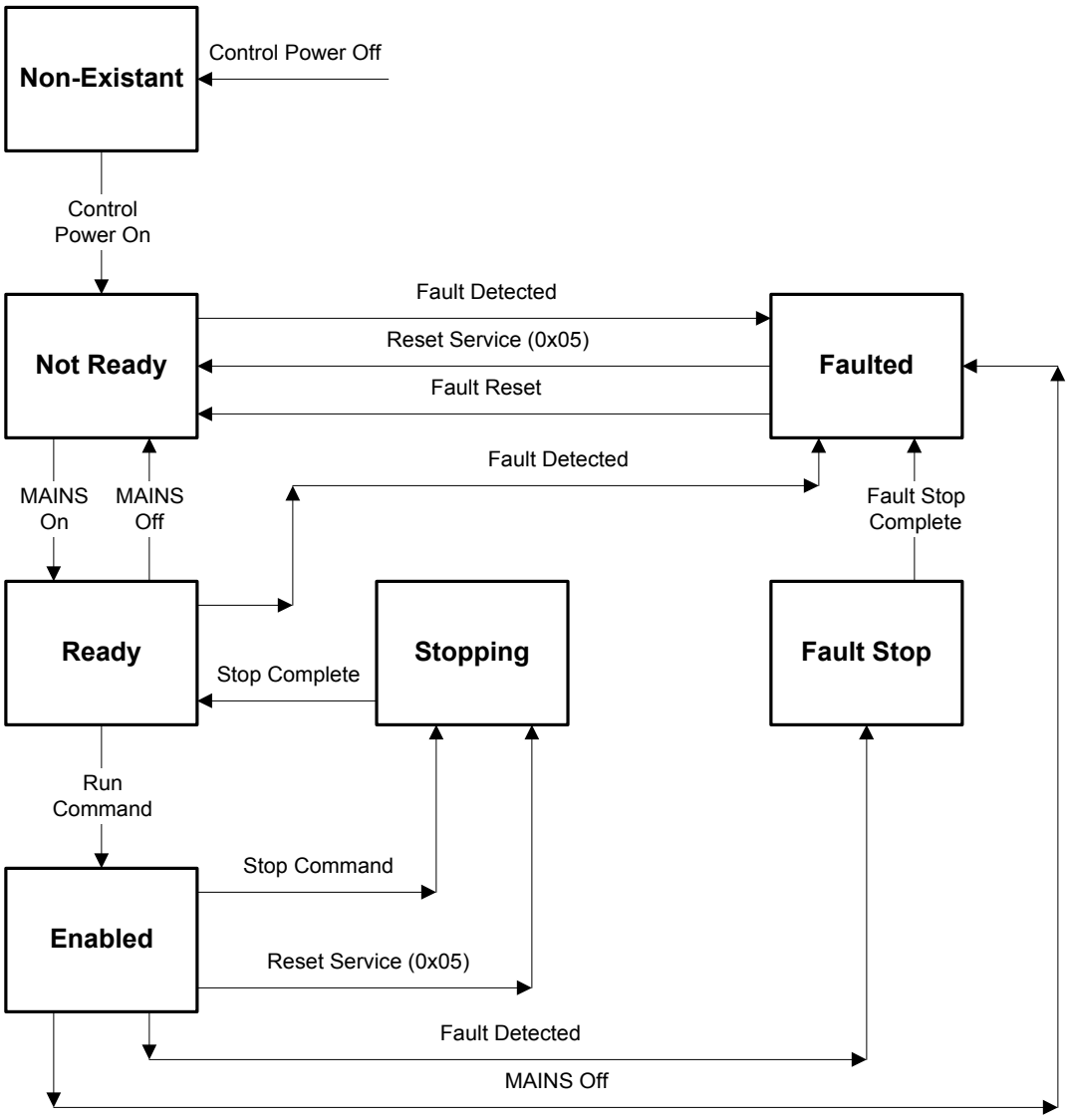


Figure 2 - Control Supervisor State Machine

A Warning (Attribute 11) will be present whenever any fault that has been classified as Warning A, Warning B, or Warning C is active. Refer to the starter manual for details of faults and fault classifications. It will also be present when the overload state machine is in the Warning state.

The FaultCode (Attribute 13) reports the code of the last fault that caused the starter to trip. The DeviceNet specification defines fault codes that are different from the fault codes displayed on the keypad of the Micro II (as defined in the Micro II manual). The following table defines the fault codes that will be reported in the FaultCode attribute (referred to as DeviceNet Fault Code) and relates them to the

Benshaw Fault Code. The DeviceNet Fault Name column lists the Fault Codes' text labels as they are defined in the EDS file.

Table 19 – Fault Codes (DeviceNet and Benshaw)

DeviceNet Fault Code	Benshaw Fault Code	DeviceNet Fault Name	Description
0	0	No Fault	No fault
20	78	Over Current	Shearpin fault (over current trip)
21	90	Overload Lock	Overload lock
26	23 24 25 26 27 28	Current Imbal	Current imbalance, L1 high Current imbalance, L2 high Current imbalance, L3 high Current imbalance, L1 low Current imbalance, L2 low Current imbalance, L3 low
27	71	Ground Fault	Ground fault
29	79	Under Current	Under current trip
41	70	Low Control PWR	Low control voltage
51	20 21 22	Low Voltage	Low voltage, L1 Low voltage, L2 Low voltage, L3
52	17 18 19	High Voltage	High voltage, L1 High voltage, L2 High voltage, L3
54	1 2 15	Phase Reversal	Line sequence set as CBA and ABC detected Line sequence set as ABC and CBA detected Line sequence changed while running
55	4 5	Frequency	High frequency trip Low frequency trip
61	72	DIP SW Set Wrong	Invalid CT burden switch setting
62	29	Memory Fault	Parameter settings have been lost. RAM is new or battery is dead.
64	98	No MAINS Power	No MAINS power
77	87	Incomplete Seq	Incomplete sequence
103	3	No Phase Order	Phase order could not be detected
106	6	Jog Not Allowed	Jog not allowed
107	7	100% Not Allowed	100% speed not allowed
109	9	Dir Change Fault	Direction change fault
116	16	Bad OP-Code	Bad OP-Code error
130	30	Def Param Loaded	Parameters have been reset to their defaults
146	46	BIST Cancelled	BIST cancelled
149	49	Tach Loss	Tach loss
150	50	Keypad Failure	Keypad failure
151	51	TT Current Limit	Overcurrent during TruTorque ramp

DeviceNet Fault Code	Benshaw Fault Code	DeviceNet Fault Name	Description
152	52	Curr At Stop	Current detected while stopped
153	53	No Cur At Run	No current detected while running
154	54	Open Field	No field excitation present
155	55	BIST Field Failure	BIST failed the field test
156	56	No Phase Order	Phase order could not be detected
163	63	Inch Timer Limit	DC inching timer expired
168	68	Jog Timer Limit	Jog timer expired
169	69	Zero Speed Timer	Zero speed timer expired
173	73	Bypass Fault	Bypass contactor failure
174	74	UTS Timer Limit	Up To Speed (UTS) timer expired
175	75	External Trip	Thermal or external fault
176	76	Disconnect Open	Disconnect open
177	77	Inline Fault	Inline contactor failure
180	80	High Field Curr	High field current
181	81	Field Loss	No DC field current
182	82	Loss of SYNC	Motor not synchronized
183	83	High PF	High power factor
184	84	Low PF	Low power factor
191	91	Unauthorized RUN	Invalid start command
192	92	Shorted SCR L3	Shorted SCR, L3
193	93	Shorted SCR L2	Shorted SCR, L2
194	94	Shorted SCR L1	Shorted SCR, L1
195	95	Shorted SCR L2&3	Shorted SCR, L2 and L3
196	96	Shorted SCR L1&3	Shorted SCR, L1 and L3
197	97	Shorted SCR L1&2	Shorted SCR, L1 and L2
199	99	I. O. C.	I. O. C. The output of the starter is shorted

3.9 Discrete Output Object

Class Code: 0x09 (two instance)

Table 20 – Discrete Object Instance Attributes

Attribute ID	Name	Access	Data Type	Description
3	Value	Get/Set	BOOL	0 – Off 1 – On

Table 21 – Discrete Output Object Services

Service Code	Supported		Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

The two instances of the Discrete Output Object operate the two Remote Relays, RM#1 and RM#2. Instance 1 operates RM#1 and instance 2 operates RM#2.

3.10 Softstart Object

Class Code: 0x2D (one instance)

Table 22 – Softstart Object Instance Attributes

Attribute ID	Name	Access	Data Type	Description
3	At Reference	Get	BOOL	0 – Not at reference 1 – Output at end of ramp
4	Start Mode	Get/Set	USINT	10 – Current ramp 11 – TruTorque ramp 12 – Tach Feedback 13 – Kilowatt Control
5	Stop Mode	Get	USINT	0 – Coast 1 – Decel (ramp down) 2 – Brake 11 – TruTorque decel
6	Ramp Mode	Get	USINT	2 – Dual independent ramps
7	Ramp Time 1	Get/Set	UINT	0 – 120 seconds Units: 100ms
9	Ramp Time 2	Get/Set	UINT	0 – 120 seconds Units: 100ms
13	Kick Time 1	Get/Set	USINT	0 – 10 seconds Units: 100ms

Attribute ID	Name	Access	Data Type	Description
15	Energy Saver	Get/Set	BOOL	0 – Disabled 1 – Enabled
16	Decel Ramp Time	Get/Set	UINT	0 – 60 seconds Units: 100ms
100	Number of Starts	Get	UINT	Number of starts since commissioning
101	User Number of Starts	Get/Set	UINT	Number of starts since the counter was last reset to 0. 0 is the only valid value for setting.
102	Initial Current 1	Get/Set	UINT	50 – 400% of FLA
103	Max Current 1	Get/Set	UINT	100 – 600% of FLA
104	Initial Current 2	Get/Set	UINT	50 – 400% of FLA
105	Max Current 2	Get/Set	UINT	100 – 600% of FLA
106	REV Initial Current 1	Get/Set	UINT	50 – 400% of FLA
107	REV Max Current 1	Get/Set	UINT	100 – 600% of FLA
108	REV Ramp Time 1	Get/Set	UINT	0 – 120 seconds Units: 100ms
109	REV Initial Current 2	Get/Set	UINT	50 – 400% of FLA
110	REV Max Current 2	Get/Set	UINT	100 – 600% of FLA
111	REV Ramp Time 2	Get/Set	UINT	0 – 120 seconds Units: 100ms
112	Kick Current 1	Get/Set	UINT	100 – 600% of FLA
113	Kick Current 2	Get/Set	UINT	100 – 600% of FLA
114	Kick Time 2	Get/Set	USINT	0 – 10 seconds Units: 100ms
115	REV Kick Current 1	Get/Set	UINT	100 – 600% of FLA
116	REV Kick Time 1	Get/Set	USINT	0 – 10 seconds Units: 100ms
117	REV Kick Current 2	Get/Set	UINT	100 – 600% of FLA
118	REV Kick Time 2	Get/Set	USINT	0 – 10 seconds Units: 100ms
119	Jog Speed FWD	Get/Set	USINT	0 – 7% 1 – 14%
120	Jog Speed REV	Get/Set	USINT	0 – 7% 1 – 14%
121	Jog Current	Get/Set	USINT	25 – 250% of FLA
122	Jog Kick Current	Get/Set	UINT	50 – 400% of FLA
123	Jog Kick Time	Get/Set	USINT	0 – 10 seconds Units: 100ms
124	Jog Max Time	Get/Set	UINT	1 – 9000 seconds Units: 1 second
125	Coast Time 1	Get/Set	USINT	0 – 90 seconds Units: 1 second
126	Coast Time 2	Get/Set	USINT	0 – 90 seconds Units: 1 second

Attribute ID	Name	Access	Data Type	Description
127	Brake Torque 1	Get/Set	USINT	10 – 100%
128	Brake Time 1	Get/Set	USINT	0 – 30 seconds for standard duty 0 – 60 seconds for heavy duty Units: 1 second
129	Brake Torque 2	Get/Set	USINT	10 – 100%
130	Brake Time 2	Get/Set	USINT	0 – 30 seconds for standard duty 0 – 60 seconds for heavy duty Units: 1 second
131	Decel Level 1	Get/Set	USINT	10 – 100% voltage
132	Decel Level 2	Get/Set	USINT	1 – 99% voltage
133	Initial TruTorque Value	Get/Set	UINT	1 – 100% torque
134	Max TruTorque Value	Get/Set	UINT	10 – 325% torque
135	TruTorque Ramp Time	Get/Set	UINT	0 – 120 seconds Units: 100ms
136	TruTorque Decel Level 1	Get	USINT	100% torque
137	TruTorque Decel Level 2	Get/Set	USINT	1 – 100% torque
138	TruTorque Decel Ramp Time	Get/Set	UINT	0 – 100 seconds Units: 100ms
139	Field Control Mode	Get/Set	USINT	0 – Current 1 – PF
140	Field Setpoint	Get/Set	UINT	Synchronous field control current (DC) 1 – 400 Units: Amps
141	Field Max	Get/Set	UINT	Maximum allowed field current (DC) 1 – 400 Units: Amps
142	PF Setpoint	Get/Set	SINT	-0.99 – 1.00 Units: .01
143	FCX Delay	Get/Set	USINT	0 – 30 seconds Units: 1 second
144	FS1 Delay	Get/Set	USINT	0 – 20 seconds Units: 1 second
145	Incomplete Sequence Timer	Get/Set	USINT	1 – 200 seconds Units: 1 second
146	Slip Percent	Get/Set	USINT	5 – 100%
147	Pullout Retries	Get/Set	USINT	Number of resynchronization attempts after pulling out before faulting 0 – 6
148	Pullout Delay	Get/Set	USINT	1 – 30 seconds Units: 1 second
149	Phase Order	Get/Set	USINT	0 – Insensitive 1 – ABC 2 – CBA
150	PORT Byp Delay	Get/Set	USINT	0 – 3 seconds Units: 100ms

Attribute ID	Name	Access	Data Type	Description
151	Heater Current	Get/Set	USINT	5 – 25% of FLA DC heating current

Table 23 – Softstart Object Services

Service Code	Supported		Name
	Class	Instance	
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

Refer to the starter manual for details of each of the parameters that are accessed through the Softstart object.

4. Troubleshooting

Table 24 – Network Status LED

LED	State	Indicates	Corrective Measures
Off	Off-Line	• The starter is the only node on the network.	• Verify that there is a master node operating on the network.
		• The baud rate is set incorrectly.	• Change the baud rate of the starter to match that of the master node and reset the starter.
		• The starter is not configured to communicate over DeviceNet.	• Verify that the COMM Mode parameter in the Comm settings menu is set to DNet.
Blinking Green	On-Line, Not Connected	• A master node has not taken ownership of the starter.	• Verify that there is a master node operating on the network and that it is configured to communicate with the starter.
Green	On-Line, Connected	• The starter has been successfully allocated to a master.	
Blinking Red	Connection Time-Out	• The Poll I/O Connection has Timed-Out.	• Reset the starter. • Send a Reset service to the Identity object of the starter. • Verify that the master sends polls to the starter within 4 * EPR as reported by the starter's connection object.
Red	Critical Link Failure	• Duplicate MAC ID failure.	• Change the MAC ID of the starter.
		• Network power is not being supplied through the DeviceNet connector.	• Verify that there is at least 11 volts between the V+ and V- terminals of the DeviceNet connector (pins 5 and 1).

Table 25 – Module Status LED

LED	State	Indicates	Corrective Measures
Off	No Power	• The software on the CPU card is not running.	• Verify that the starter has control power.
Green	Device Operational	• The starter is operating normally.	
Blinking Red	Recoverable Fault	• Battery RAM problem.	• Reset the parameters to their defaults.
Red	Unrecoverable Fault	• There is a problem with the keypad.	• The starter must be serviced.

5. Data Types

The following table defines the data types used in this document and lists their corresponding data type codes used in the Electronic Data Sheet (EDS) file.

Table 26 – DeviceNet Data Types

Data Type Name	Data Type Code (hex)	Data Type Description	Range
BOOL	C1	Boolean	False (0) and True (1)
SINT	C2	Short Integer (8 bits)	-128 to 127
INT	C3	Integer (16 bits)	-32,768 to 32,767
USINT	C6	Unsigned Short Integer (8 bits)	0 to 255
UINT	C7	Unsigned Integer (16 bits)	0 to 65,535
BYTE	D1	Bit string – 8-bits	
WORD	D2	Bit string – 16-bits	
SHORT STRING	DA	Character string (1 byte per character, 1st byte is length indicator)	

6. Benshaw Services

Benshaw offers its customers the following services:

- Start-up services
- On-site training services
- Technical support
- Detailed documentation
- Replacement parts

Benshaw technical field support personnel are available to assist customers with the initial start-up of the RediStart Micro II. Information about start-up services and fees are available by contacting Benshaw.

Benshaw technical field support personnel are available to conduct on-site training on RediStart Micro II operations and troubleshooting.

Benshaw technical support personnel are available (at no charge) to answer customer questions and provide technical support over the telephone.

Benshaw provides all customers with:

- Operations manual
- Wiring diagram

All drawings are produced in AutoCAD© format. The drawings are available on standard 3.5" diskettes or via e-mail by contacting Benshaw.

Spare and replacement parts can be purchased from Benshaw.

Benshaw Products

Low Voltage Solid State Reduced Voltage Starters

- RSD/RSM6 - SSRV Non or Separate Bypass
- RDB/RMB6 - SSRV Integral Bypass
- RSM7 - SSRV + DC Injection Braking
- RSM10 - SSRV Reversing
- RSM10/12TS - SSRV Two Speed
- RSM11 - SSRV + DC Brake & Reversing
- WRSM6 - SSRV Wound Rotor
- SMRSM6 - SSRV Synchronous
- DCB3 - Solid State DC Injection Braking

Medium Voltage Solid State Reduced Voltage Starters

- 5kv - Induction or Synchronous to 10,000HP
- 7.2kv - Induction or Synchronous to 10,000HP
- 15kv - Induction or Synchronous to 60,000HP

Low Voltage - AC Drives

- Standard Drives to 1000HP
- Custom Industrial Packaged Drives
- HVAC Packaged Drives
- 18 Pulse/IEEE 519 Compliant Drives

Low Voltage - Contactors & Full Voltage Starters

- RSC Series Contactors
- SPO/SPE/SPD Motor Protection Relays
- Enclosed Full Voltage, Wye Delta, Two Speed, Part Winding and Reversing Starters

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