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DMC^2

Digital Motion Controller

DMC^2 Connection

Art.No. 9032 0027 11

21.03.2001

Inmotion Technologies AB
Stockholm, Sweden

Table of Contents

DMC^2 Connections

GENERAL

This section provides details for connecting the DMC^2 to motor connections, power, dynamic brake, thermistor /brake, DC Bus, I/O, Daisy chain, LAN 2 and integral resolver.

The motor cable connector nomenclature and location is different for the various DMC^2 models.

WARNING

- **Failure in properly ground this equipment could result is serious or fatal injury to personnel who come into contact with the equipment. All earth grounds must be installed per the instructions in this chapter, and the equipment must be securely connected to a quality earth ground before power is applied for the first time. In addition, the panel or enclosure housing the equipment must be securely earth grounded.**
- **Local regulations may require additional grounding measures beyond those shown in this chapter.**
- **Failure to properly ground the equipment may result in damage to the equipment or damage to other devices connected to the equipment.**

WARNING

- **This equipment uses high voltages, which can cause serious or fatal electrical shock.**
- **Can cause serious or fatal injury.**
- **Only qualified personnel should perform installation and wiring.**

X CONNECTOR'S

DSUB CONNECTOR'S

Connector	D-Sub miniature in Metal housing	Pin	Male	Female
X4 and X5	High Density, VGA	15		X
X6A	Standard	15		X
X6B	Standard	25		X
X8A	Standard	9	X	
X9	Standard	9	X	

DMC² FRONT

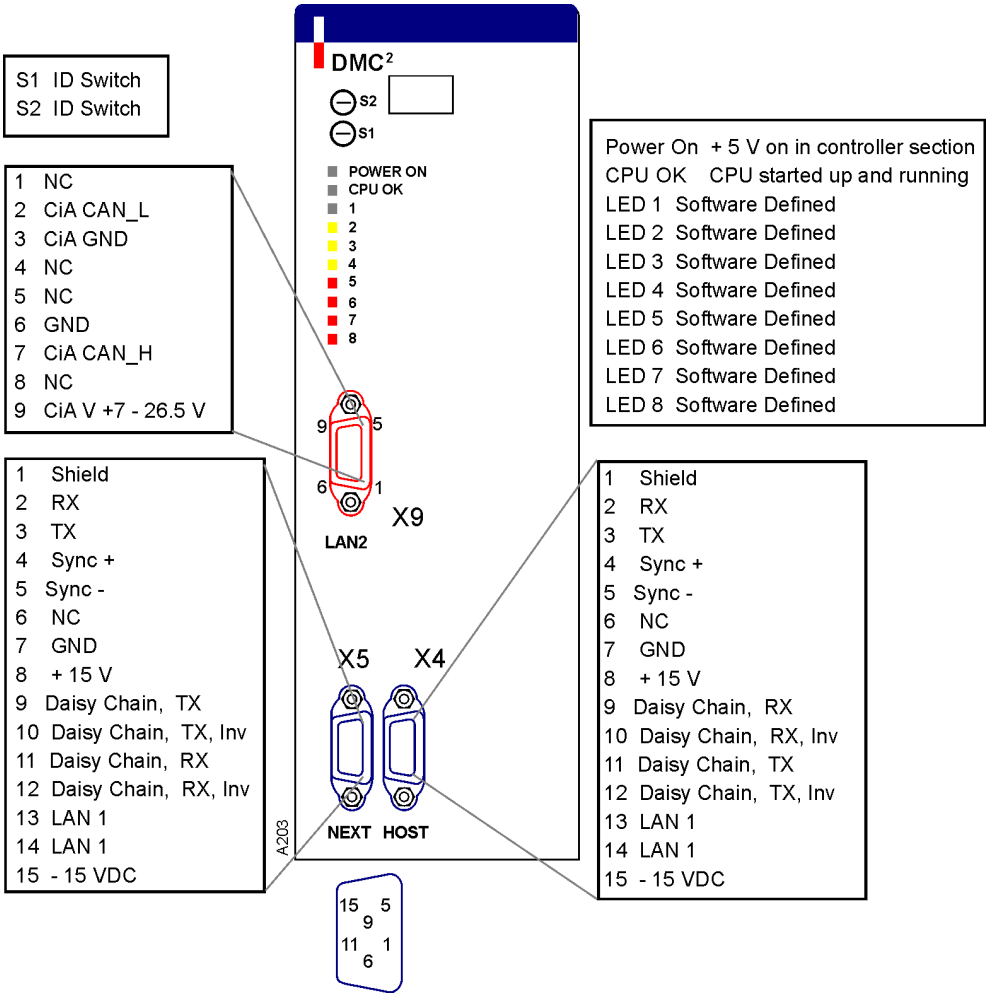

Figure 1. DMC² Front and Connections.

DMC² I/O CONNECTIONS

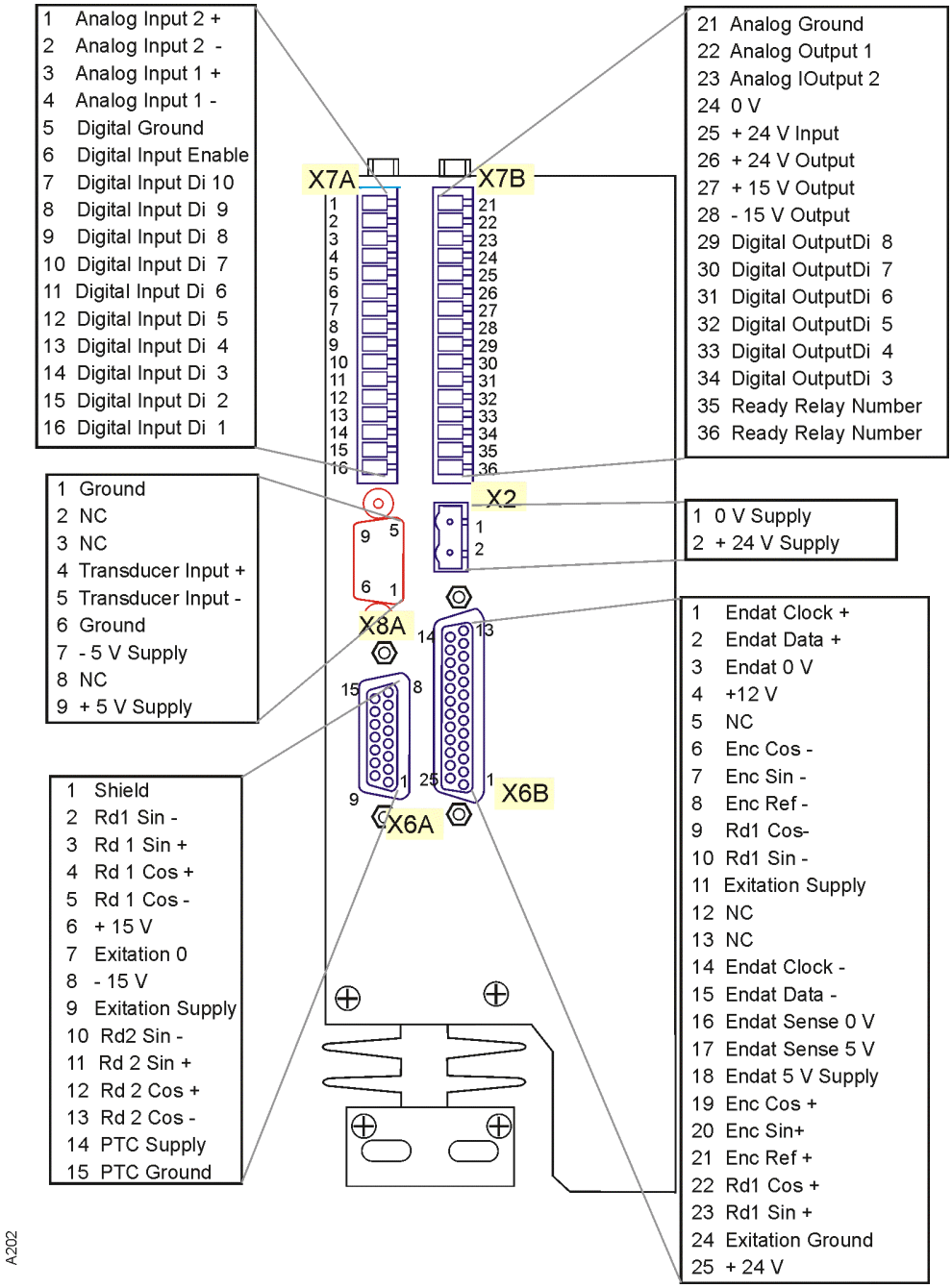

Figure 2. I/O Connections for all DMC² units, bottom view.

DMC^2 50412/P, DMC^2 50720/P

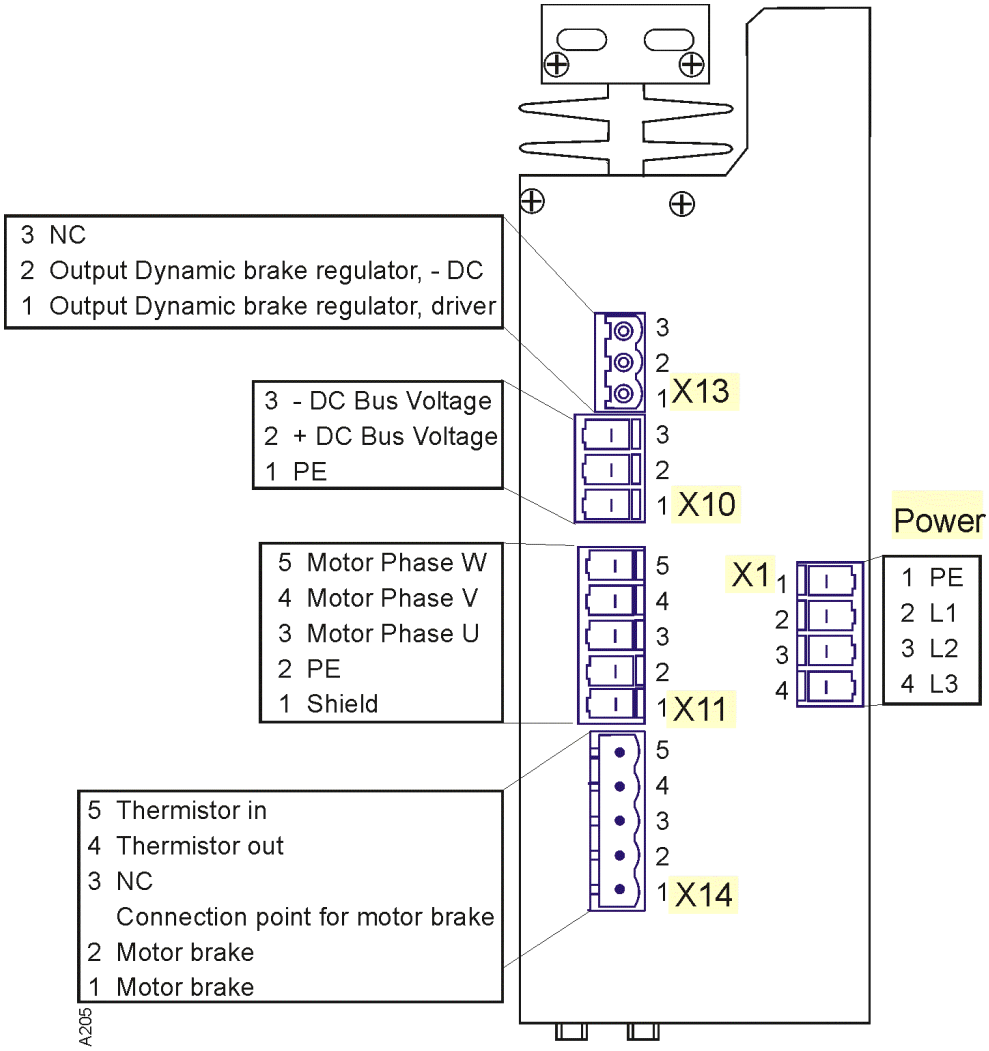

Figure 3. DMC^2 unit connectors on the topside, Motor, Power, Thermistor, DC Bus for 50412/P and 50720/P.

DMC^2 51540/P, DMC^2 53080

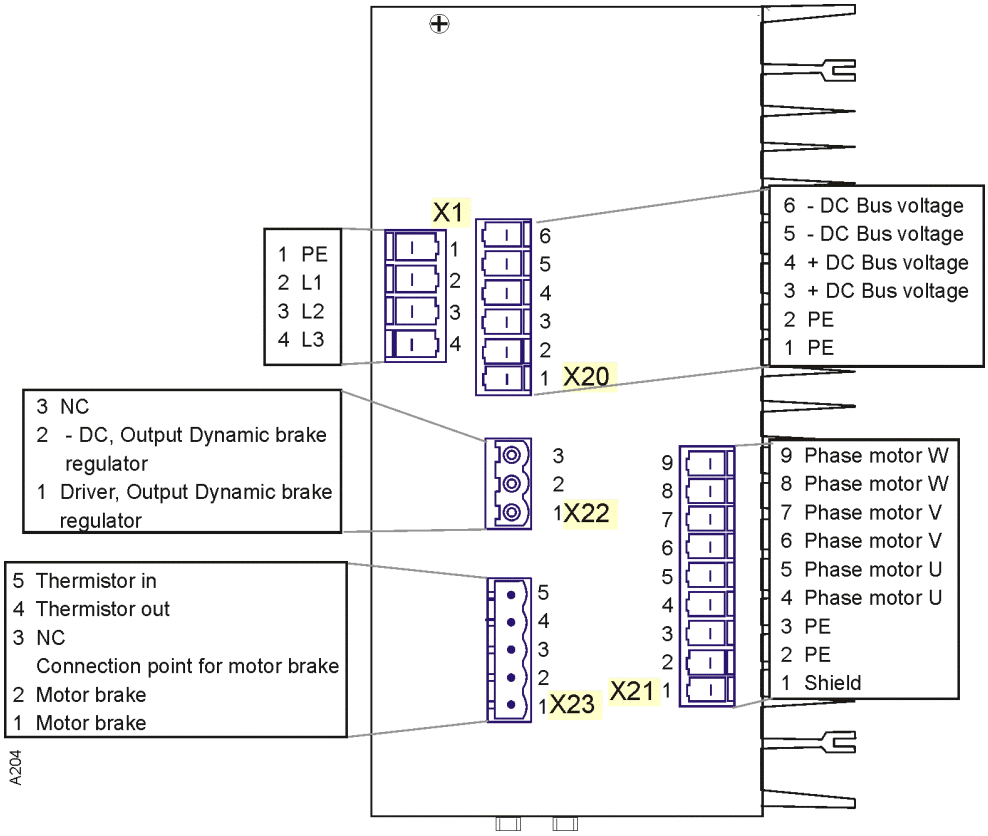

Figure 4. DMC^2 unit connectors on the topside, Motor, Power, Thermistor, DC Bus for 51540/P and 53080.

POWER SUPPLY 580160

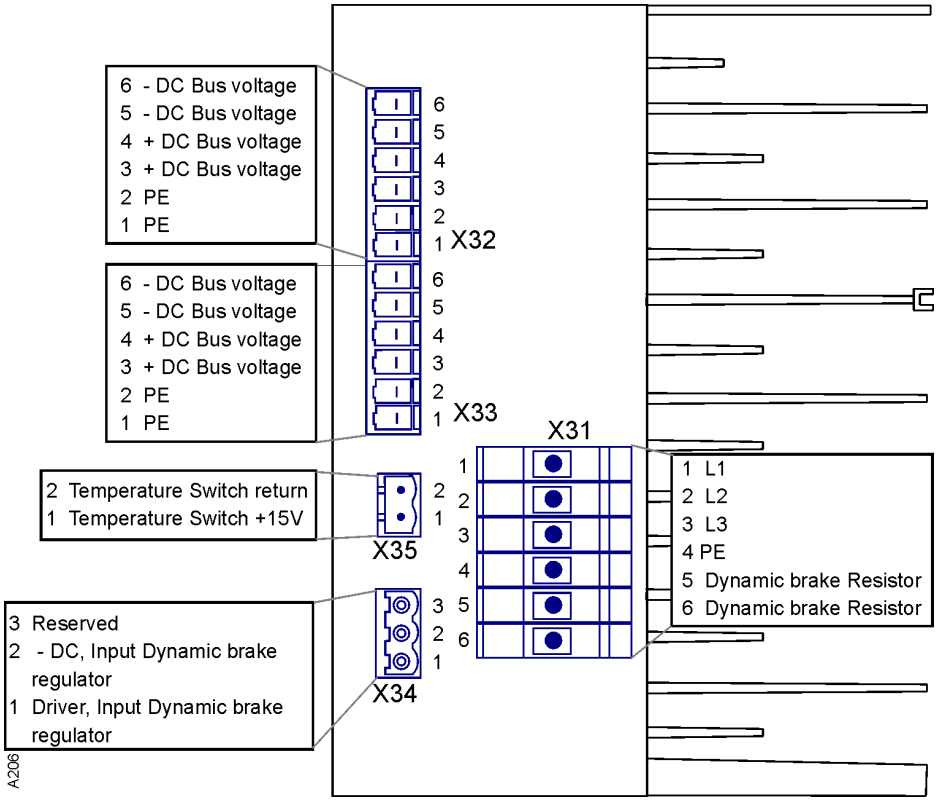

Figure 5. PS 580160 unit connectors on top side, Power, Dynamic brake and Thermistor.

X1

DMC^2 P	50412	50720	51540	
DMC^2	50412	50720	51540	53080
Connector	See User's Manual part A.			

Input power is connected to X1 Figure 3 or Figure 4 on top of the DMC^2 unit as shown in Figure 7 for a Single and Figure 8 for a Master/Follower application.

Connect DMC^{2}5xxxxP models to 400 VAC mains.

DMC^2 X1	Function
1	PE
2	Phase L1
3	Phase L2
4	Phase L3

Table 1. Connection Mains to DMC^2.

X2

DMC^2 P	50412	50720	51540	
DMC^2	50412	50720	51540	53080
Connector	See User's Manual part A.			

Connections for 24V external logic supply voltage. When connected, it supplies the internal control circuit, feedback sensors, communication and I/O ports.

The 24V logic supply shall always be connected before the main supply voltage is connected to the input power port. External fuse shall be used rated max 1.5A T (slow).

DMC^2 X2	Function	Remark
1	0 V Supply	Internal connected to X7A,pin 5
2	+ 24 V Supply, +20%: -20%, maximum supply current 0.7A (not including load on digital outputs)	Internal connected to X7B, pin 25

Table 2. External +24 V Connection to DMC^2.

X4 (HOST)

DMC^2 P	50412	50720	51540	
DMC^2	50412	50720	51540	53080
Connector	See page	6		

X4 is used for connections between external PC and other DMC^2 units.

The maximum length for this cable is 15 m.

DMC^2 X4 (Host)	Function
1	Shield
2	RX
3	TX
4	Sync+
5	Sync-
6	NC
7	GND
8	+15 V
9	Daisy Chain, RX
10	Daisy Chain, RX inv
11	Daisy Chain, TX
12	Daisy Chain, TX inv
13	LAN 1
14	LAN 1
15	-15 VDC

X5 (NEXT)

DMC^2 P	50412	50720	51540	
DMC^2	50412	50720	51540	53080
Connector	See page	6		

X5 is used for communication between two or more DMC^2 and for LAN1 communication.

DMC^2 X5 (Next)	Function
1	Shield
2	RX
3	TX
4	Sync+
5	Sync-
6	NC
7	GND
8	+15 V
9	Daisy Chain, TX
10	Daisy Chain, TX inv
11	Daisy Chain, RX
12	Daisy Chain, RX inv
13	LAN 1
14	LAN 1
15	-15 VDC

X4 AND X5 CONNECTION

RS 232 INTERFACE

The RS-232 interface is used when connecting a PC to the DMC^2. Connect the serial communication cable from the computer to X4 (Figure 1.).

DMC^2 X4	Function	PC 9 Pin	PC 25 Pin
1	Shield		
2	RX	3	2
3	TX	2	3
7	GND	5	7

Table 3. Host (X4) Connection to RS 232 Interface.

COMMUNICATION BETWEEN DMC^2

Connect the Daisy Chain cable from X5 (Figure 1.) on the first DMC^2 unit to X4 on the second DMC^2 unit (Table 4.).

X6A

DMC^2 X4	Function	DMC X5
1	Shield	1
4	Sync +	4
5	Sync -	5
7	GND	7
9	Daisy chain Rx ↔ Tx	9
10	Daisy chain Rx Inv ↔ Tx Inv	10
11	Daisy chain Tx ↔ Rx	11
12	Daisy chain Tx Inv ↔ Rx Inv	12
13	LAN 1 High	13
14	LAN 1 Low	14

Table 4. Host (X4) Connection to Next (X5) on DMC^2.

LAN 1 COMMUNICATION

Connect the Daisy Chain cable from X5 on the first DMC^2 unit to X4 on the second DMC^2 unit (Figure 1.). Use the CAN termination 9032 0103 14 at the first DMC^2 in the application and a CAN termination with possibility to measure data 9032 0103 15 at the last DMC^2 in the application.

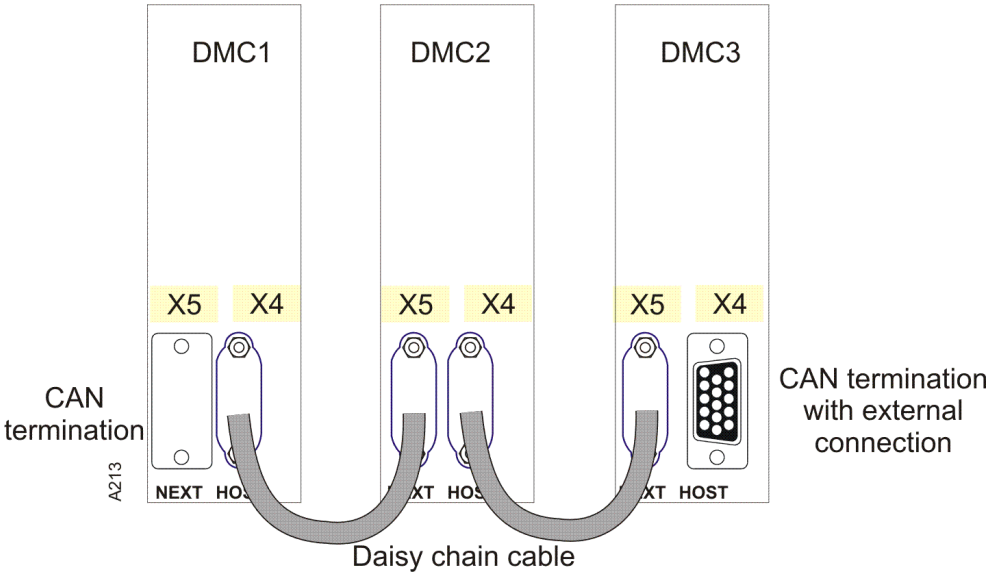

Figure 6. Typicaly LAN connection.

X6A

DMC^2 P	50412	50720	51540	
DMC^2	50412	50720	51540	53080
Connector	See page	6		

This connector is used for resolver and external resolver connection. For location see Figure 2.

RESOLVER AND EXTERNAL RESOLVER CONNECTION

RESOLVER CONNECTION FROM MOTOR

On the DMC^2 end, connect the resolver cable to X6A.Use our connection set 19N117K. The connection on motor side is depending on the manufacturer of motor. It's therefore important to check the motor wiring diagram.

EXTERNAL RESOLVER

For input from an external resolver is Rd2 used and is connected to X6A on the DMC^2. See Table 5.

DMC^2 X6A	Function	Rd1	Rd2
1	Shield	X	
2	Rd1 Sin -	X	
3	Rd1 Sin +	X	
4	Rd1 Cos +	X	
5	Rd1 Cos -	X	
6	+15 V		
7	Ground	X	X
8	-15 V		
9	Exitation	X	X
10	Rd2 Sin -		X
11	Rd2 Sin +		X
12	Rd2 Cos +		X
13	Rd2 Cos -		X
14	PTC Supply		
15	PTC Ground		

Table 5. External Resolver Connection.

SYNCBOX

At applications with more than one resolver is a syncbox necessary to use. Use a Syncbox cable to connect the DMC^2 with the Syncbox at X6A.

X6B

DMC^2 P-CAM	50412	50720	51540	
DMC^2-CAM	50412	50720	51540	53080
Connector	See page 6			

This connector could be used for the following sensors:

Sensor	Description
S1	Multiturn-Resolver with ENDAT serial interface.
S2	SinCos Encoder and Absolute SinCos Encoders with ENDAT serial interface.
S3	Incremental Encoder with index pulse, TTL interface and 5V supply.
S4	Pulse input, max input frequency 30 kHz.

DMC² X6B	S1	S2	S3	S4	Function	Remark
1	X	X			Endat Clock+	ENDAT, RS485
2	X	X			Endat Data+	ENDAT, RS485
3	X	X	X		Endat 0 V	0 V supply; ENDAT or Encoder
4					+12 V	(+12 V Supply, 150 mA, not standard opt.).
5					NC	
6		X	X		Enc Cos-	ENDAT 1 Vpp or Encoder 5V TTL,120 ohm.
7		X	X		Enc Sin-	ENDAT 1 Vpp or Encoder 5V TTL,120 ohm.
8		X	X	X	Enc Ref-	ENDAT 1 Vpp or Encoder 5V TTL,120 ohm.
9	X				Rd1 Cos-	Internal connected to X6A:5
10	X				Rd1 Sin-	Internal connected to X6A:2
11	X				Excitation Supply	Internal connected to X6A:9
12					NC	
13					NC	
14	X	X			Endat Clock-	ENDAT, RS485
15	X	X			Endat Data-	ENDAT, RS485
16	X	X			Endat Sence 0 V	ENDAT, Voltage drop detection
17	X	X			Endat Sence 5 V	ENDAT, Voltage drop detection
18	X	X	X		Endat 5 V Supply	ENDAT, Max 300mA
19		X	X		Enc Cos+	ENDAT 1 Vpp or Encoder 5V TTL,120 ohm.
20		X	X		Enc Sin+	ENDAT 1 Vpp or Encoder 5V TTL,120 ohm.
21		X	X	X	Enc Ref+	ENDAT 1 Vpp or Encoder 5V TTL,120 ohm.
22	X				Rd1 Cos+	Internal connected to X6A:4
23	X				Rd1 Sin+	Internal connected to X6A:3
24	X				Excitation Ground	Internal connected to X6A:7
25					+24 V	(+24 V Supply, 150 mA, not standard opt.).

Table 6. CAN connection on X6B. X indicates used pin.

X7A/B

DMC² P	50412	50720	51540	
DMC²	50412	50720	51540	53080
Connector	See User's Manual part A.			

All user connections to the DMC² I/O are made at X7A and X7B and Figure 2. illustrates the location.

PINOUTS USER I/O

All user inputs and outputs are brought out to connectors X7A and X7B and are listed in Table 7 below.

DMC² X7A		DMC² X7B	
	Function		Function
1	Analog input 2+	21	Analog GND
2	Analog input 2-	22	Analog output 1
3	Analog input 1+	23	Analog output 2
4	Analog Input 1-	24	Digital GND
5	GND	25	Input for +24 VDC external supply Parallel with X2:2
6	Digital input, HW enable	26	+24 VDC out
7	Digital input 10	27	+15 VDC out
8	Digital input 9	28	-15 VDC out
9	Digital input 8	29	Digital output 6
10	Digital input 7	30	Digital output 5
11	Digital input 6	31	Digital output 4
12	Digital input 5	32	Digital output 3
13	Digital input 4	33	Digital output 2
14	Digital input 3	34	Digital output 1
15	Digital input 2	35	Ready relay output, N.O.
16	Digital input 1 Used as other inputs and as HSI = High Speed Input	36	Ready relay output, N.O.

Table 7. I/O Connection (X7A and X7B) at DMC².

X8A

DMC² P-CAN	50412	50720	51540	
DMC²-CAN	50412	50720	51540	53080
Connector	See page	6		

For location, see Figure 2.

X9A

DMC² X8A	Function	Comment
1	GND	
2	NC	
3	NC	
4	Measure bridge Input +	Measure bridge input ±50mV.
5	Measure bridge Input -	Measure bridge input ±50mV.
6	GND	
7	-5V Supply Output	Supply to measure bridge. Max 10mA.
8	NC	
9	+5V Supply Output	Supply to measure bridge. Max 10mA.

Table 8. Measure Connection (X8).

X9A

DMC² P	50412	50720	51540	
DMC²	50412	50720	51540	53080
Connector	See page	6		

The CAN Bus is used for an external network. For location, see Figure 2.

DMC² X9A	Function	Comment
1	NC	
2	CiA CAN_L	
3	CiA GND	
4	NC	
5	NC	Shield
6	GND	Ground
7	CiA CAN_H	
8	NC	
9	CiA V+ 7-26.5 V	Supply

Table 9. LAN2 (X9) Connection.

X10

DMC² P	50412	50720
DMC²	50412	50720
Connector	See User's Manual part A.	

Table 10 illustrates the input power connections to a DC supplied unit from an AC (P version) supplied unit. Connect the DC bus voltage from X10 to X10. Figure 8 show this application.

DMC² P X10	Function	DMC² X10
1	PE	1
2	+ DC bus voltage 570 VDC	2
3	- DC bus voltage 570 VDC	3

Table 10. DC Bus Connection.

X11

DMC² P	50412	50720
DMC²	50412	50720
Connector	See User's Manual part A.	

Figure 3 shows the connector X11. Table 11. describes the function. The motor connections are the same for AC and DC supplied DMC²s.

Use the appropriate threaded strain relief with shield connection listed in User's Manual part A to secure the motor cable to the junction box at the motor:

The cable shield must make secure metallic contact with the strain relief.

DMC² X11	Function
1	Shield
2	PE
3	Motor U
4	Motor V
5	Motor W

Table 11. Motor Connection (X11) to DMC².

X13

DMC² P	50412	50720
DMC²	50412	50720
Connector	See User's Manual part A.	

Make the following dynamic brake circuit connections (Table 12), from X13 on DMC² Figure 3 unit to X34 Figure 3 on PS unit.

DMC² X13	Function	PS unit X34
1.	Output dynamic brake regulator, driver.	1
2.	Output dynamic brake regulator, -DC.	2
3.	NC.	3

Table 12. Dynamic brake (X13 and X34) Connection.

X14

DMC^2 P	50412	50720
DMC^2	50412	50720
Connector	See User's Manual part A.	

Make the following connections (Table 13) at the DMC^2, (Figure 3 for placement) X14, and the terminal block at the motor for thermistor and brake connections. See motor documentation for correct wiring.

DMC^2 X14	Function
1	Motor brake, Contact NO.
2	Motor brake, Contact NO.
3	NC, used as connection point for motor brake.
4	Thermistor out +15 VDC
5	Thermistor return

Table 13. Thermisto/brake (X14) Connection to DMC^2.

X20

DMC^2 P		51540	
DMC^2		51540	53080
Connector	See User's Manual part A.		

Table 14. illustrates the input power connections to a DC supplied unit from an AC (P version) supplied unit. Connect the DC bus voltage from X20 (Figure 4 for placement) to X20. Figure 8 show how X10 is connected.

DMC^2 P X20	Function	DMC^2 X20	DMC^2 X20
1	PE	1	1
2	PE	2	2
3	+ DC bus voltage 570 VDC	3	
4	+ DC bus voltage 570 VDC		4
5	- DC bus voltage 570 VDC	5	
6	- DC bus voltage 570 VDC		6

Table 14. DC Bus Connection (X20) between AC and DC.

X21

DMC^2 P		51540	
DMC^2		51540	53080
Connector	See User's Manual part A.		

Figure 4. shows the connector X21. Table 15 describes the function The motor connections are the same for AC and DC supplied DMC^{2}s.

Use the appropriate threaded strain relief with shield connection listed in User's Manual part A to secure the motor cable to the motor.

The cable shield must make secure metallic contact with the strain relief.

DMC^2 X21	Function
1	Shield
2	PE
3	PE
4	Motor U
5	Motor U
6	Motor V
7	Motor V
8	Motor W
9	Motor W

Table 15. Motor Connection (X21) to DMC^2.

X22

DMC^2 P		51540	
DMC^2		51540	53080
Connector	See User's Manual part A.		

Make the following dynamic brake circuit connections (Table 16) from X22 Figure 4 on DMC^2 unit to X34 on PS unit.

DMC^2 X22	Function	PS unit X34
1	Output dynamic brake regulator, driver	1
2	Output dynamic brake regulator, -DC	2
3	Reserved	3

Table 16. Dynamic brake (X22 and X34) Connection.

X23

DMC^2 P		51540	
DMC^2		51540	53080
Connector	See User's Manual part A.		

Make the following connections (Table 17) at the DMC^{2,} (Figure 4 for placement) X23 and the terminal block at the motor for thermistor and brake connections.

DMC² X23	Function
1	Motor brake, Contact NO
2	Motor brake, Contact NO
3	NC, used as connection point for motor brake.
4	Thermistor out +15 VDC
5	Thermistor return

Table 17. Thermistor/brake (X23) Connection to DMC².

X31

PS	580160
Connector	See page

At the power supply, make the following connections to X31 (see Figure 5 and Figure 9) Note that the model PS580160 power supply is for 400 VAC, 3 phase applications. Use a WAGO 284 (10 mm²) Terminal block for interfacing to X31.

PS X31	Function
1	Phase L1, 400 VAC
2	Phase L2, 400 VAC
3	Phase L3, 400 VAC
4	PE
5	Dynamic brake resistor
6	Dynamic brake resistor

Table 18. Input Power at PS (X31).

X32 & X33

PS	580160
Connector	See User's Manual part A.

DMC² 50412 OR DMC² 50720 DC BUS CONNECTION

The following information is applicable to DC supplied DMC²S ONLY.
Make the connections listed in Table 19 below from X32 or X33 (Figure 5) on the stand-alone PS unit to X10 on the DMC² unit (see Figure 3.) Note that X32 and X33 have a maximum current ration of 20 amps per pin.

PS unit X32 / X33	Function	DMC² X10	DMC² X10
1	PE	1	
2	PE		1
3	+ DC bus voltage	2	
4	+ DC bus voltage		2
5	- DC bus voltage	3	
6	- DC bus voltage		3

Table 19. DC Bus Connection from PS to DMC² 50412 and DMC² 50720.

DMC² 51540 OR DMC² 53080 DC BUS CONNECTION

Make the connections listed in Table 20 below from X32 or X33 (Figure 5) on the stand-alone PS unit to X20 on the DMC² unit (see Figure 4.).
Note that X32 and X33 have a maximum current rating of 20 amps per pin.

PS unit X32	Function	DMC² X20	
(1.)	PE	1	
(2.)	PE	2	
3.	+ DC bus voltage	3	
4.	+ DC bus voltage	4	
5.	- DC bus voltage	5	
6.	- DC bus voltage	6	
PS unit X33	**Function**		**DMC² X20**
(1.)	PE		1
(2.)	PE		2
3.	+ DC bus voltage		3
4.	+ DC bus voltage		4
5.	- DC bus voltage		5
6.	- DC bus voltage		6

Table 20. DC Bus Connection from PS to DMC² 51540 and DMC² 53080.

X34

PS	580160
Connector	See User's Manual part A.

Make the following dynamic brake circuit connections from X34 (Figure 5) on PS unit to X13 (Figure 3) or X22 (Figure 4) on DMC² unit.

PS unit X34	Function	DMC^2 X13	DMC^2 X22
1.	Output dynamic brake regulator, driver.	1	1
2.	Output dynamic brake regulator, -DC.	2	2
3.	Reserved.	3	3

Table 21. Dynamic brake connection (X34).

X35

PS	580160
Connector	See User's Manual part A.

Make the following thermistor connections from X35 (Figure 5) on PS unit to X14 (Figure 3) or X23 (Figure 4) on DMC^2 unit.

PS unit X35	Function	DMC^2 X14	DMC^2 X23
1.	Temperature switch out +15 VDC.	4	4
2.	Temperature switch return.	5	5
	NC, used as connection point.	3	3

Table 22. Thermistor connection (X35).

INPUT WIRING DIAGRAM

SINGLE INSTALLATION

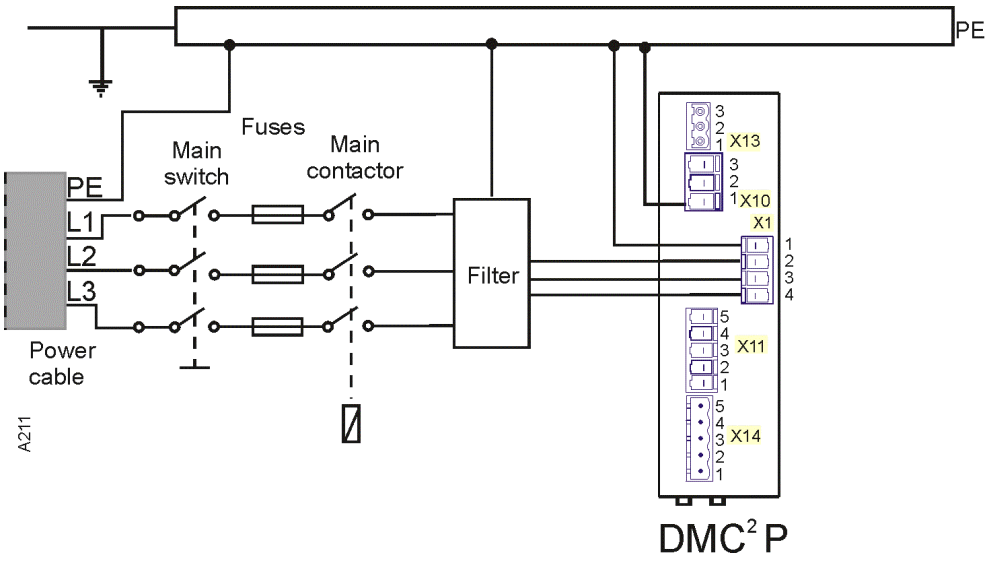

Figure 7. Input power connection to a single application.

DMC²-P/ DMC² INSTALLATION

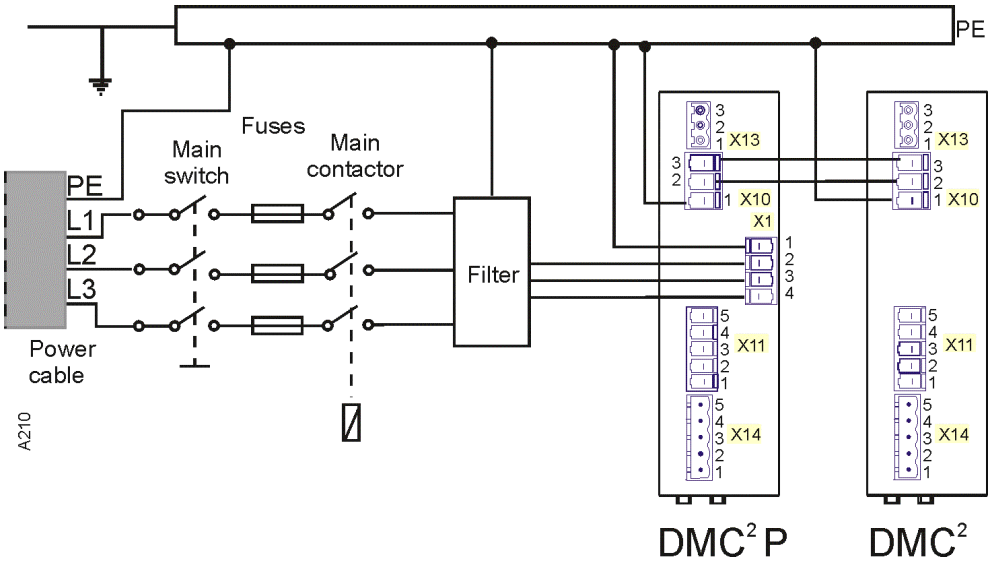

Figure 8. Input power connection to a Master/Follower application.

Input wiring diagram

POWER SUPPLY/DMC^2 50412, 50720 INSTALLATION

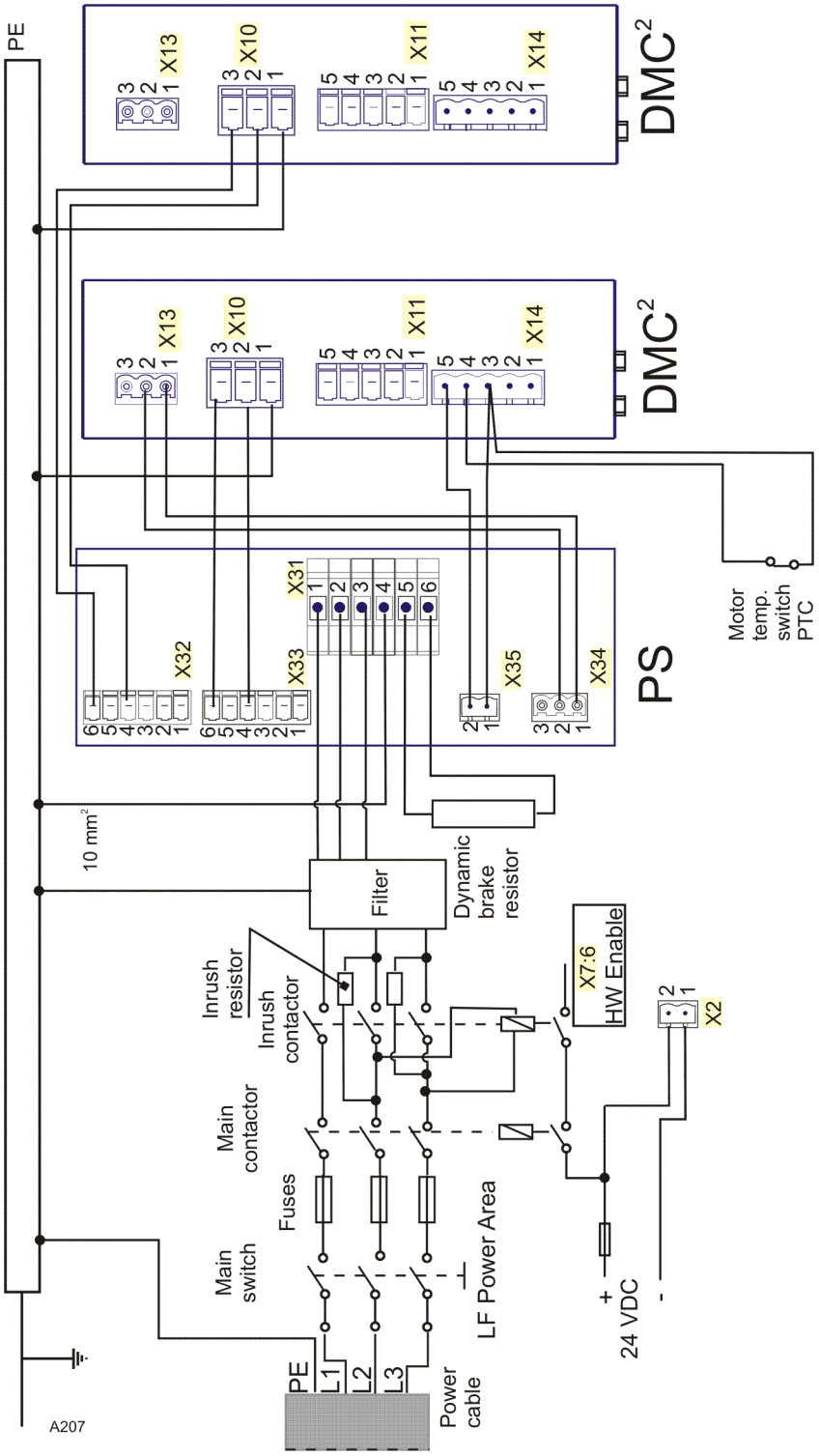

Figure 9. Input power connection to a Power Supply application and DMC^2.50412, 50720.

POWER SUPPLY/DMC^2 51540, 53080 INSTALLATION

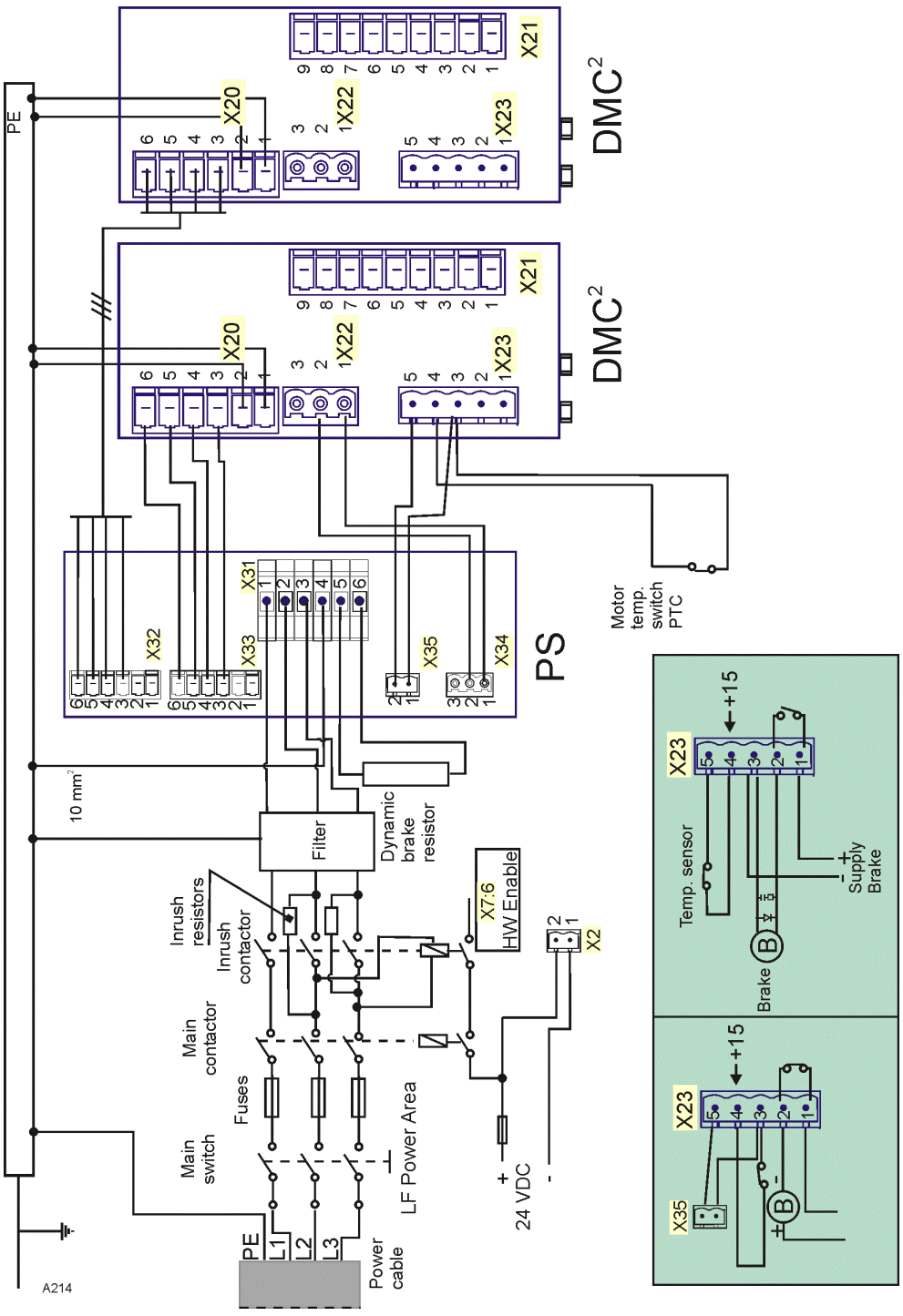

Figure 10. Input power connection to a Power Supply applicationand DMC^2 51540 and 53080.