User's Guide

Supplement to Users' Guide
ABB ACS250
and Eaton DC1 VFDs

Rev. 02 2018-08-01

Table of Contents

Reference Documents

SOURCE	TITLE	DOWNLOAD REF
ABB	ABB ACS250 Users' Guide	https://library.e.abb.com/public/e26638e1f3cd410e85257db00052f1a2/3AUA0000137830_REVB.pdf
ABB	ABB ACS250 Users' Guide – 600V variants	https://library.e.abb.com/public/0f8c901fd61bbb9c85257dbd005028b7/3AUA0000138354_REVB.pdf
Eaton	Eaton DC1 VFD Installation Manual MN04020003Z_EN	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020003Z_EN.pdf
Eaton	Eaton DC1 VFD Parameter Manual MN04020003Z_EN	ftp://ftp.moeller.net/DOCUMENTATION/AWB_MANUALS/MN04020004Z_EN.pdf
Lev-co	Users' Guide - Control Systems for VFD-Based Fume and Dust Collection Systems	Request from Lev-co

Revision Record

DATE	Rev No.	Description
2018-03-02	00	First Release
2018-04-02	01	Added Note section 2.2
2018-08-01	02	Drawing and textual updates for clarity; corrections as noted on drawings

Warranty

This product is guaranteed to be free of defects in materials or workmanship for a period of one (1) year from date of delivery. Lev-co undertakes to repair and/or replace any such defect within the warranty period at no cost to the client. Any action by the client involving attempted repair and/or replacement either by himself or a third party voids this and all warranties.

If such exists, Lev-co extends the warranty of the manufacturer(s) for components used in this product under the terms stipulated in said warranty(ies). No other warranty is either express or implied.

1 Introduction

This Manual Supplement provides detailed documentation on the use of an ABB ACS250 or Eaton DC1 VFD in a Lev-co Fume and Dust Extraction System.

These two drive types are similar in most essential characteristics – installation, control wiring and operation. In most installations, they may be used interchangeably. They each have their own Owners' Manuals, which are noted in the Reference Documents table. The user should refer to the appropriate section in the appropriate manual when mentioned in the text below.

The differences in the drives include the following:

- The ABB drives include a 600V variant; the Eaton drives do not offer this capability
- Drive programming, while similar and providing identical functionality, is **not** identical

Technical documentation is attached below. The user is encouraged to start with a detailed reading of the appropriate Owners' Manual to gain an understanding of installation, wiring and setup issues. This should be followed by a study of the schematic for the system supplied to gain an understanding of what the system elements are and how they are connected. The systems covered in this supplement are:

- Model 13-12 – Type 1 – VFD as a Contactor Replacement
- Model 13-13 – Type 2 – VFD System with Constant Duct Pressure
- Model 13-14 – Type 3 – Type 2 System with Controlled Electrical Dampers
- Model 13-74 – Type 2 System with Vibra-Pulse Cleaning
- Model 13-75 – Type 2 System with Shaker Motor Cleaning
- Models 13-76 and 13-77 – Type 2 System with Sequenced Solenoids Cleaning

Items which are critical for safety, performance, or compliance with legal requirements are highlighted in RED and marked with this symbol. 

2 Installation

2.1 Mechanical Installation

The control package comprises two units: a control panel and a separate VFD. These may be mounted as desired, although care must be observed in selecting the location of the VFD.

 **The VFD must be located within a 50m cable run from the motor for best performance and motor life.**

See section 4 of the ABB User Guides or sections 3.1 through 3.4 of the Eaton DC1 Installation Manual for detailed installation information. Note that the VFD keypad is used for drive setup and manual override and should thus be easily operator-accessible.

The installation may also require a pressure-sensing hose – see section 4.1 of the Lev-Co User Guide.

Three or four-conductor and STP cables are used to connect the Control Panel and the VFD. A maximum separation of 10 feet is recommended, using the cable types shown as recommended on the drawings.

2.2 Electrical Installation

Power wiring must observe the requirements of the Canadian Electrical Code CSA C22.1-15. Additionally, screened wiring is recommended for the connection from the VFD to the motor. See section 6.1 of the ABB ACS250 User Guide, sections 5.8 and 5.9 of the ABB ACS250 – 600V Variants User Guide or section 3.6 of the Eaton DC1 Installation Manual for detailed installation information.

Using the recommended cables, follow the Schematic Diagram to connect the Control Panel and the VFD.

A RUN LIST is provided for each wiring installation, and some of the Models (the most common) also have Wiring Diagrams. **Note the jumpers on the VFD and ensure they are in place.**

NOTE: For Eaton drives type DC1-…A6SN, the local control wiring on terminals 1/2/3/5/6/7 must be removed.

3 VFD Setup

Standard VFD setup is shown herein. For detailed information see sections 8, 9 and 10 of the ABB ACS250 User Guide, sections 7, 8 and 9 of the ABB ACS250 – 600V Variants User Guide or the Eaton Parameter Manual. When performing this setup, a comprehensive list of all parameter settings should be created for future reference. Carefully observe the notes on the setup drawings.

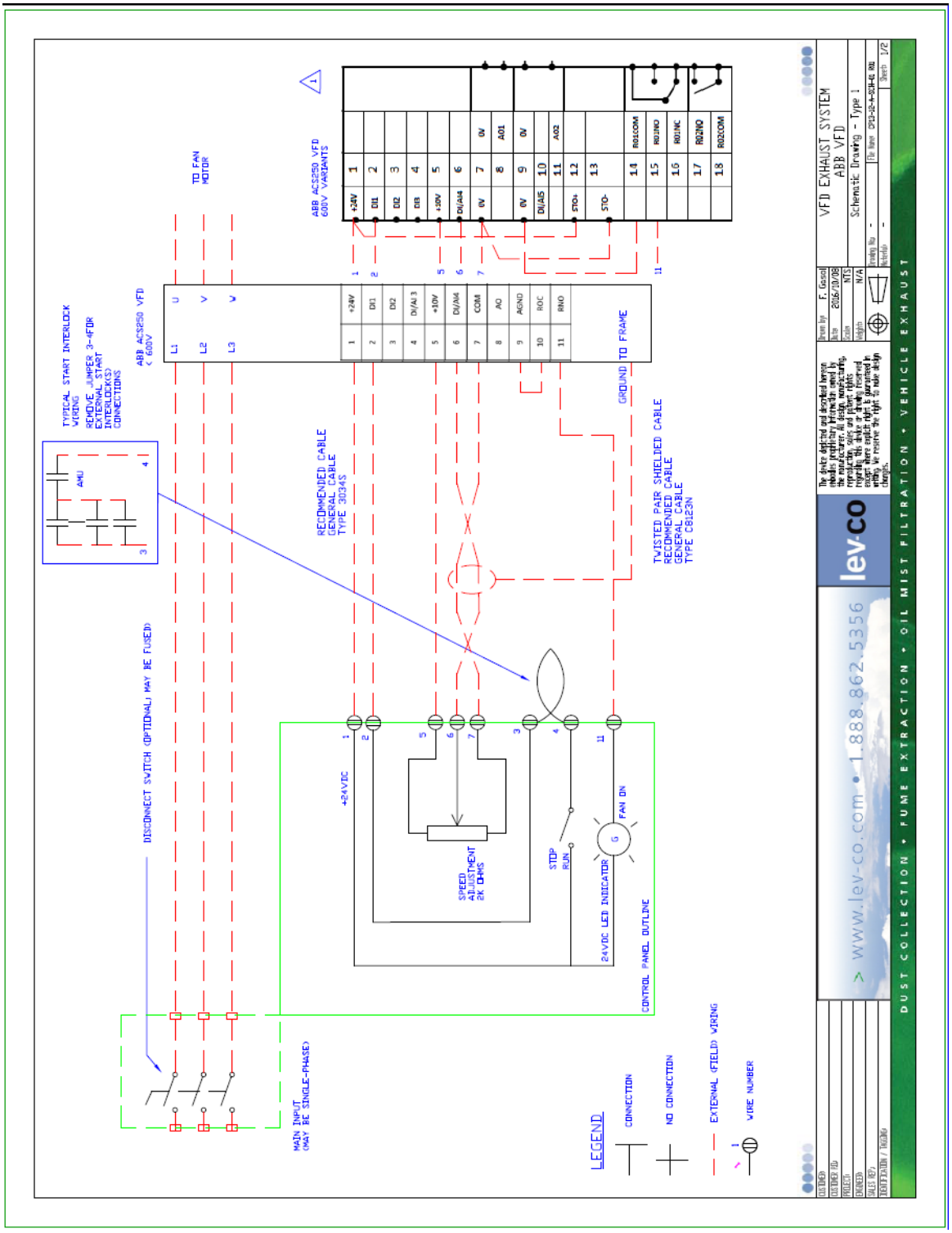
4 Drawings

Drawings follow below.

NOTE: All type 2 and type 3 systems have identical panel-to-drive wiring and drive programming. Hence, this information is presented only once, at the end of this section.

4.1 Model 13-12 – Type 1 – VFD as a Contactor Replacement

4.1.1 Schematic Diagram – ABB ACS250 and 600V Variant Drives



4.1.2 Drive Programming – ABB ACS250 and 600V Variant Drives

1 ADDED WIRING FOR 600V VARIANTS
CHANGED PARAMETER 9902 FOR
COMPLIANCE WITH 600V VARIANTS
2017-12-12 FG

Lev-Co Parameters Setup for Type 1 ABB ACS250 VFD Systems

1

Parameters which are left at factory default are not listed. However, making a comprehensive list of all parameters is recommended.

Code	Description	Set To	Units	Meaning	Notes
9902	DIGITAL INPUT T FUNCTION SELECT	1			Sets operation of terminals 1 - 4
9905	Motor Nameplate Volts	See Note	Volts		Enter Nameplate Data
9906	Motor Nameplate FLA	See Note	Amps		Enter Nameplate Data
9908	Motor Rated Speed	0	RPM		Leaves parameters in Hz
1103	PRIMARY COMMAND SOURCE MODE	0		Terminal Mode	Operation via speed pot
1300	ANALOG INPUT 1 SIGNAL FORMAT	U0-10		0 - 10 V	
1401	OUTPUT RELAY FUNCTION SELECT	0		FAN ON Signal	
2007	MINIMUM FREQUENCY	20	Hz		Minimum for motor cooling
2202	ACCELERATION TIME 1	See Note	sec	Ramp up time	Set as desired. Typ = 30 secs
2203	DECELERATION TIME 2	See Note	sec	Ramp down time	Set as desired. Typ = 30 secs

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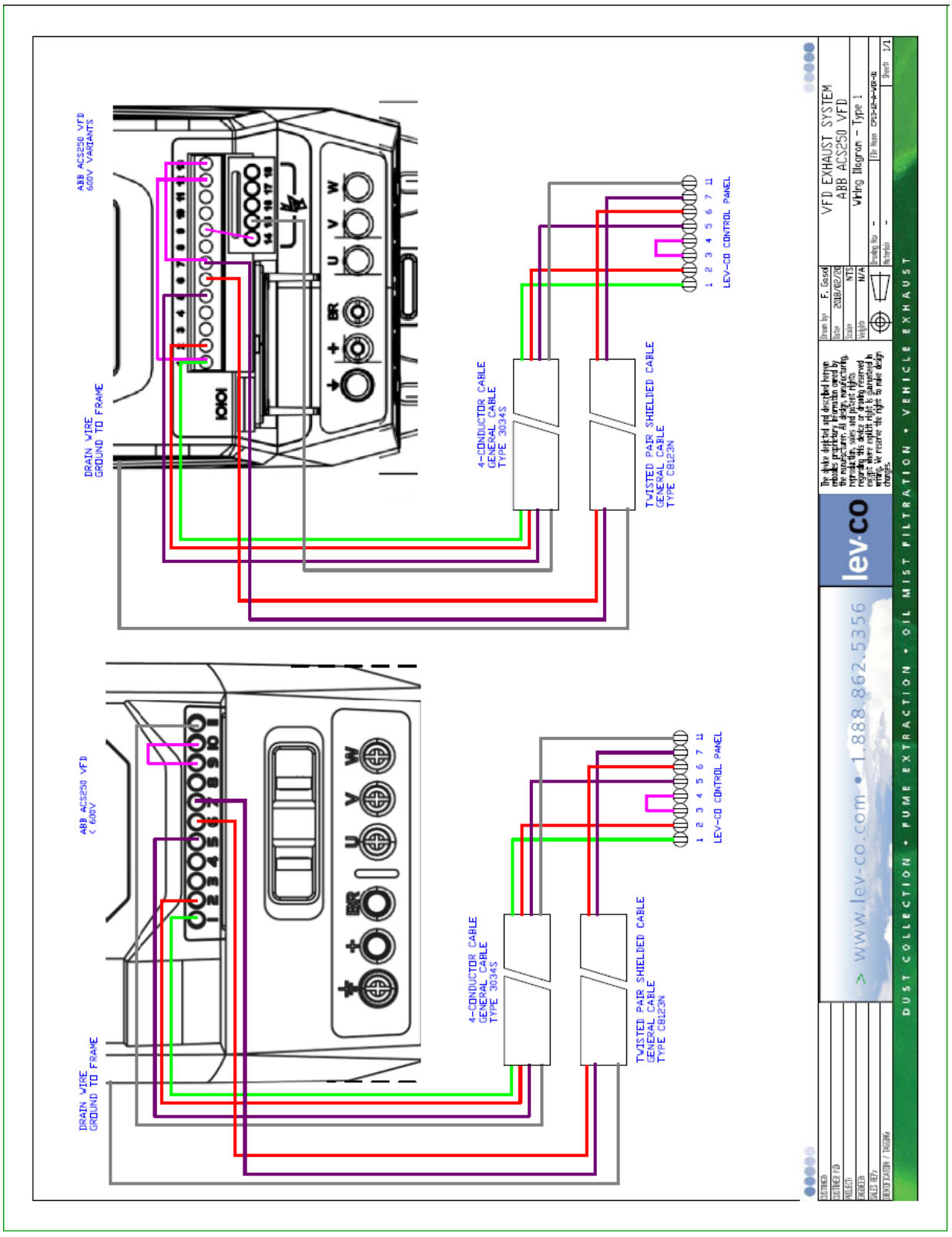
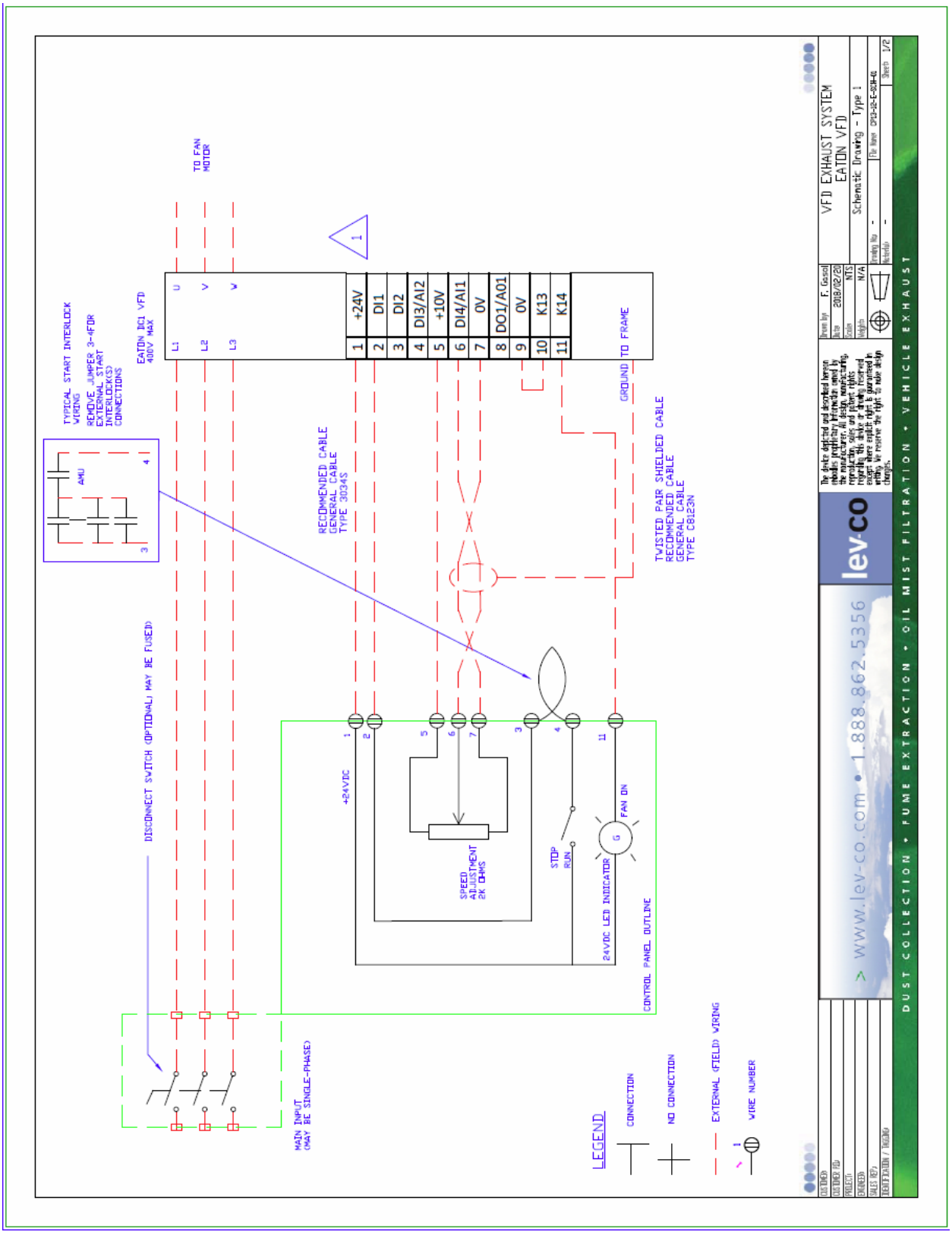
VFD EXHAUST SYSTEM
ABB VFD
Schematic Drawing - Type 1

4.1.3 Wiring Diagram – ABB ACS250 and 600V Variant Drives



4.1.4 Schematic Diagram – Eaton DC1 Drives



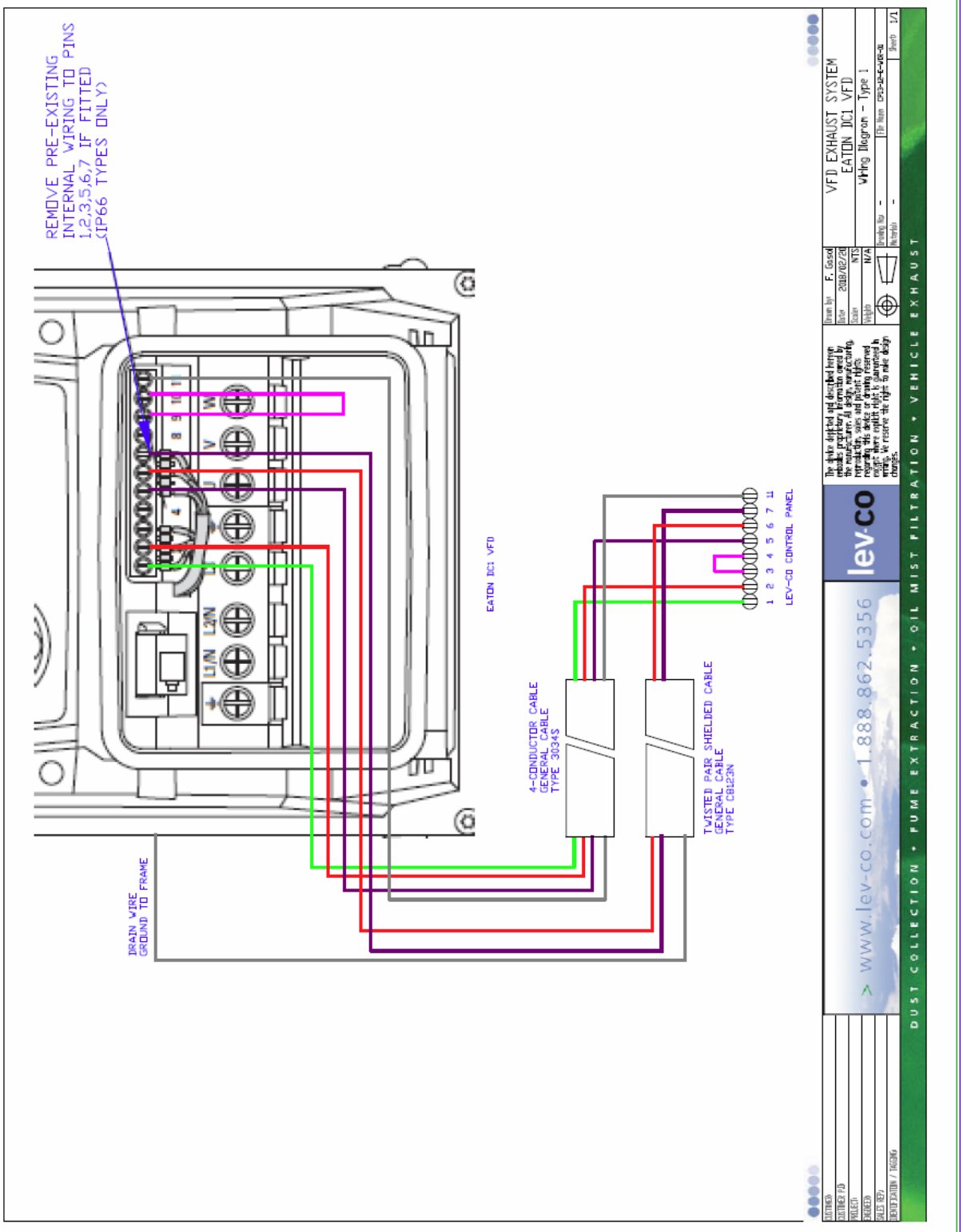
1 CORRECTED DRIVE PIN DESIGNATIONS
UPDATED PARAMETER LIST
2018-07-26 FG

Lev-Co Parameters Setup for Type1 Eaton DC1 VFD Systems

1 **NOTE: Parameters which are not shown are unchanged from default**

Code	Description	Set To	Units	Meaning	Default	Notes
P-01	f-max	60	Hz	Drive maximum frequency	50	May be set higher if overspeed operation desired
P-02	f-min	20	Hz	Drive minimum frequency	0	Set for motor cooling
P-03	t-acc	30	sec	Acceleration ramp time	5	May be set as desired. 30 is typical
P-04	t-dec	30	sec	Deceleration ramp time	5	May be set as desired. 30 is typical
P-05	Stop mode	0		Ramp to stop	1	Default is coast to stop
P-07	Motor Voltage	See note	V	Nameplate voltage		Set to motor nameplate voltage
P-08	Motor Current	See note	A	Nameplate current		Set to motor nameplate current
P-09	Motor Frequency	60	Hz	Nameplate frequency	50	
P-10	Motor Speed	0	RPM		0	Leave parameters in Hz rather than RPM
P-12	Local Process Data Source	0		Terminal Control	0	
P-14	Password	101		Enable access to extended parameters	0	
P-15	DI Config Select	5			5	Functions of digital inputs - see table in Eaton manual
P-16	AI1 range	0		0-10V	0	Control input 0 - 10V

4.1.6 Wiring Diagram – Eaton DC1 Drives



4.1.7 RUN LIST Model 13-12 ABB ACS250 and Eaton DC1

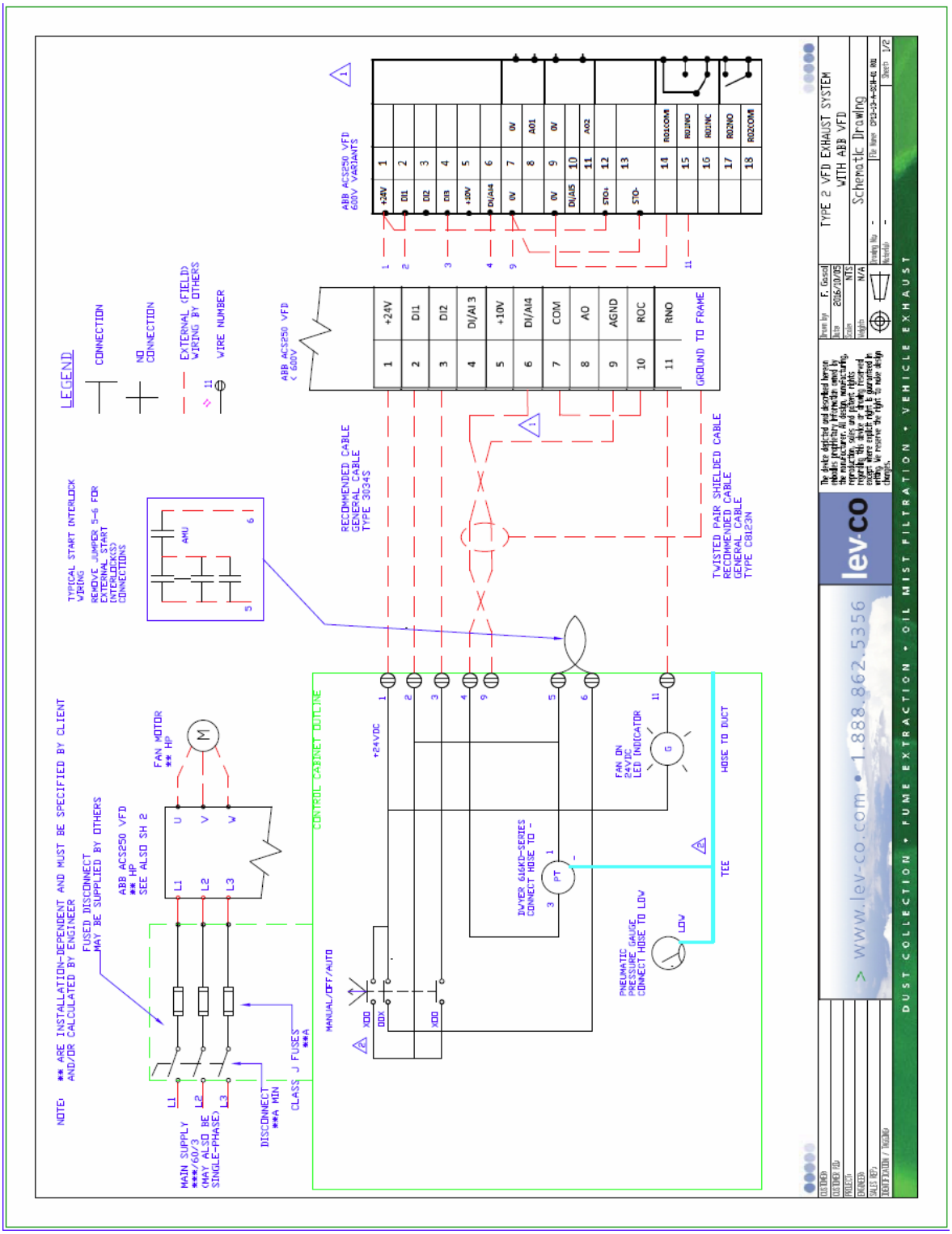
CABLE	COLOUR	FROM	TO
4-conductor	GREEN	Control Panel 1	VFD 1
4-conductor	RED	Control Panel 2	VFD 2
4-conductor	BLACK	Control Panel 5	VFD 5
4-conductor	WHITE	Control Panel 11	VFD 11
STP	RED	Control Panel 6	VFD 6
STP	BLACK	Control Panel 7	VFD 7
STP	SHIELD	No Connection	VFD FRAME
JUMPER	Any	VFD 9	VFD 10

4.1.8 RUN LIST Model 13-12 ABB ACS250 – 600V Variants

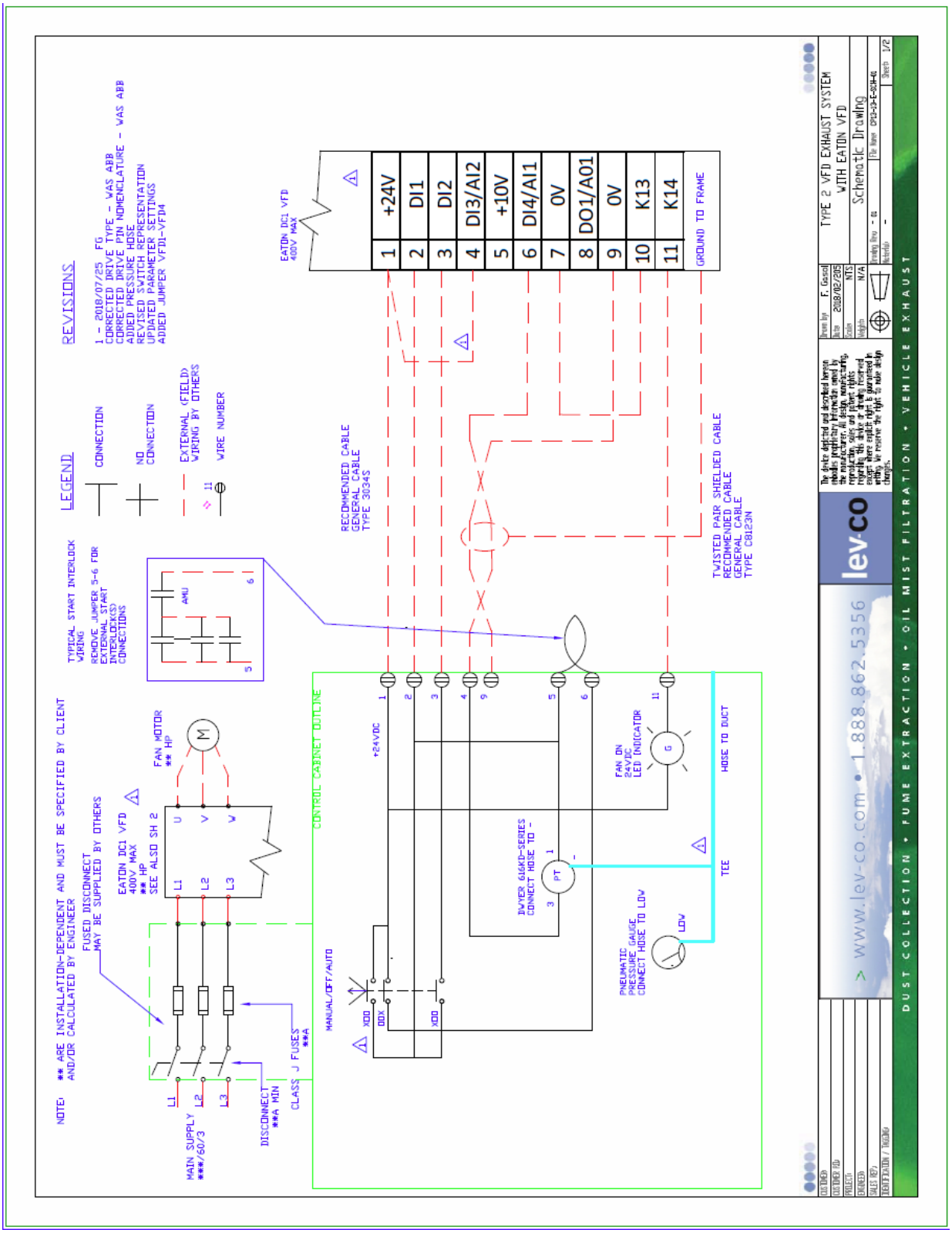
CABLE	COLOUR	FROM	TO
4-conductor	GREEN	Control Panel 1	VFD 1
4-conductor	RED	Control Panel 2	VFD 2
4-conductor	BLACK	Control Panel 5	VFD 5
4-conductor	WHITE	Control Panel 11	VFD 15
STP	RED	Control Panel 6	VFD 6
STP	BLACK	Control Panel 7	VFD 7
STP	SHIELD	N/C	VFD FRAME
JUMPER	Any	VFD 1	VFD 12
JUMPER	Any	VFD 7	VFD 13
JUMPER	Any	VFD 9	VFD 14

4.2 Model 13-13 – Type 2 – VFD System with Constant Duct Pressure

4.2.1 Schematic Diagram – ABB ACS250 and 600V Variant Drives

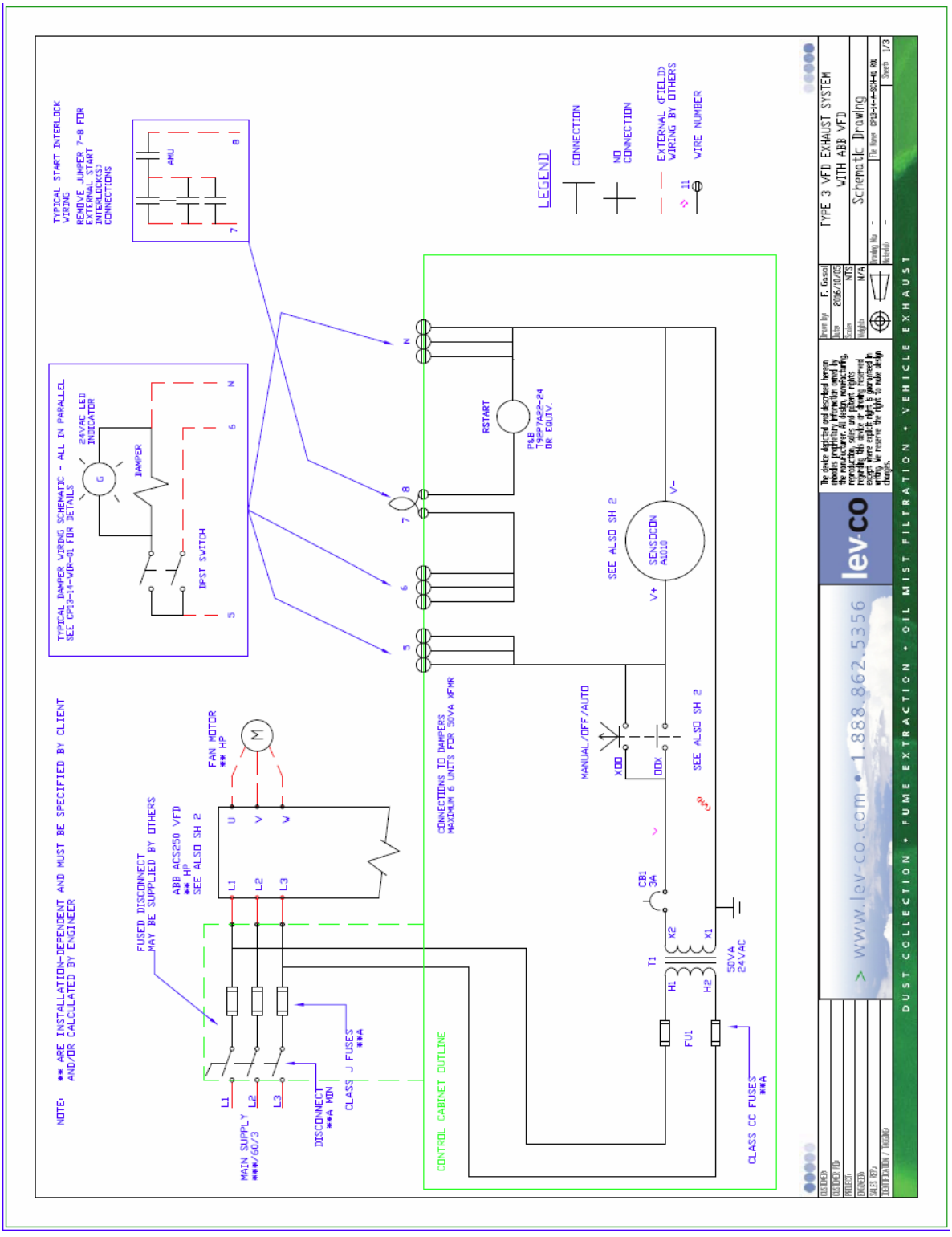


4.2.2 Schematic Diagram – Eaton DC1 Drives



4.3 Model 13-14 – Type 3 – Type 2 System with Controlled Electrical Dampers

4.3.1 Schematic Diagram – ABB ACS250 and 600V Variant Drives



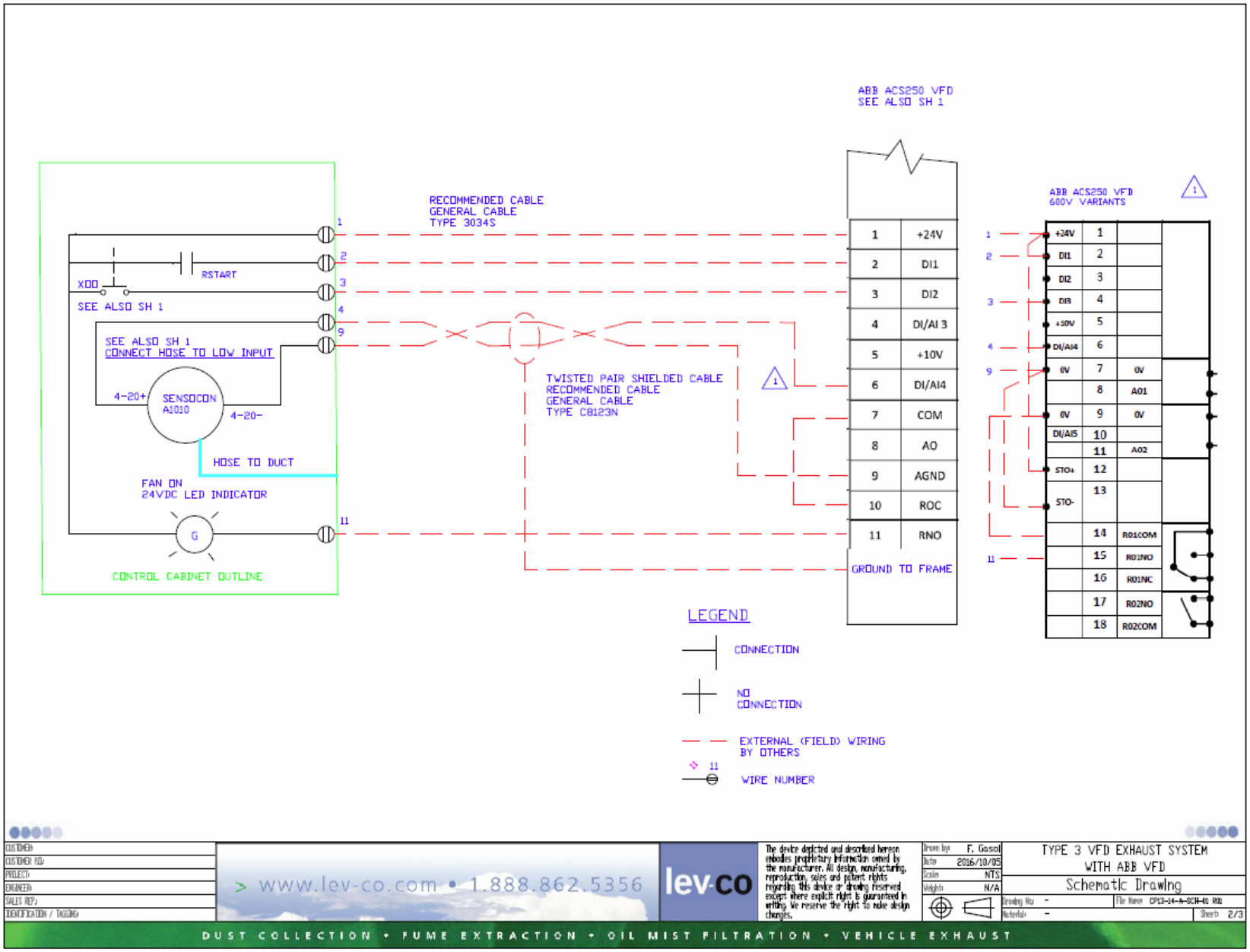


ABB ACS250 VFD
SEE ALSO SH 1
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
RSTART
X00
SEE ALSO SH 1
SEE ALSO SH 1
CONNECT HOSE TO LOW INPUT
4-20+
SENSOCON
A1010
4-20-
HOSE TO DUCT
FAN ON
24VDC LED INDICATOR
G
CONTROL CABINET OUTLINE
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
1 +24V
2 DI1
3 DI2
4 DI/AI 3
5 +10V
6 DI/AI4
7 COM
8 AO
9 AGND
10 ROC
11 RNO
GROUND TO FRAME
ABB ACS250 VFD
600V VARIANTS
+24V 1
DI1 2
DI2 3
DI3 4
+10V 5
DI/AI4 6
0V 7
0V
8 AO1
0V 9
0V
DI/AI5 10
11 AO2
STO+ 12
STO- 13
14 RO1COM
15 RO1NO
16 RO1NC
17 RO2NO
18 RO2COM
LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
WIRE NUMBER
CUSTOMER:
CUSTOMER P.O.:
PROJECT:
ENGINEER:
SALES REP.:
IDENTIFICATION / TAGGING:
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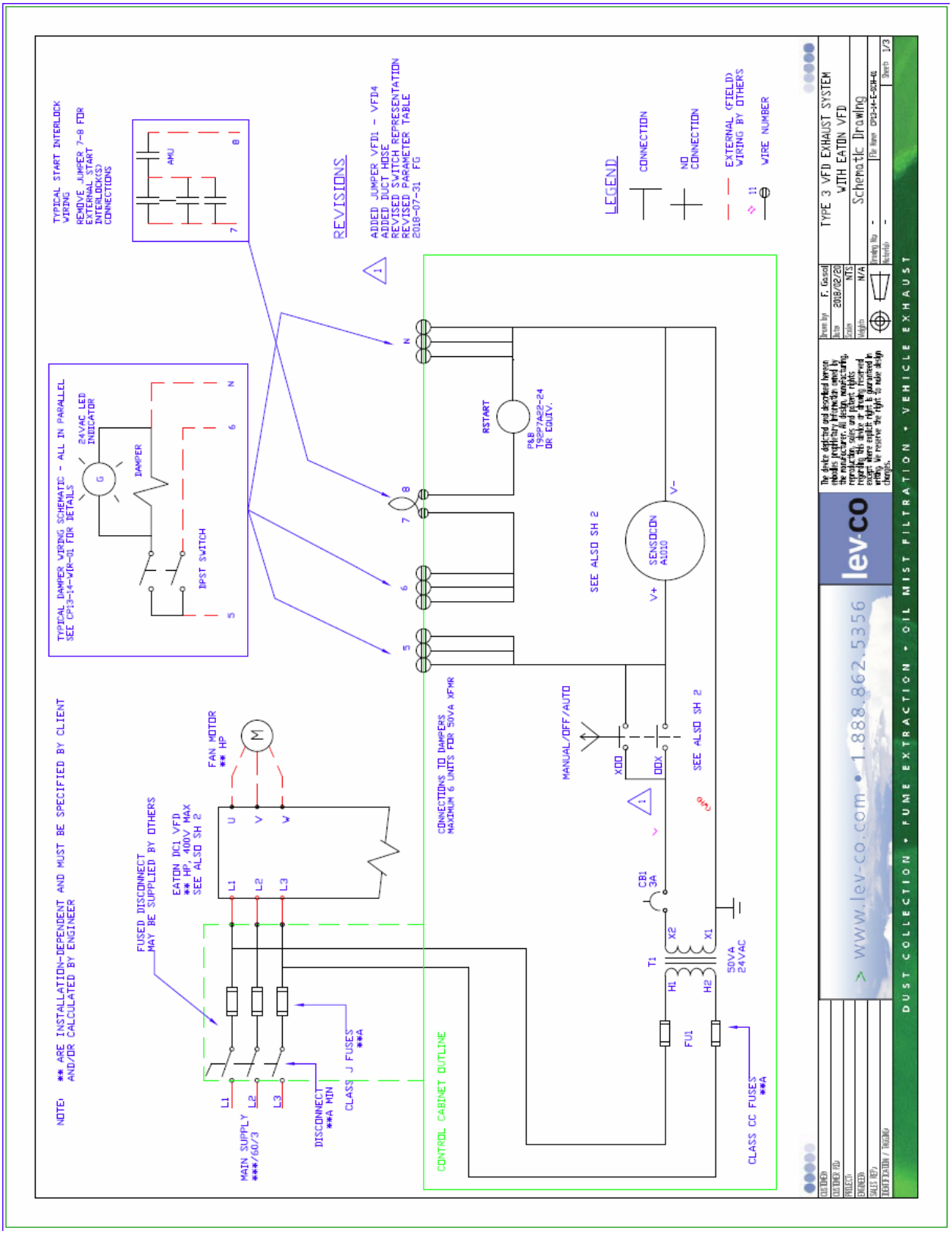
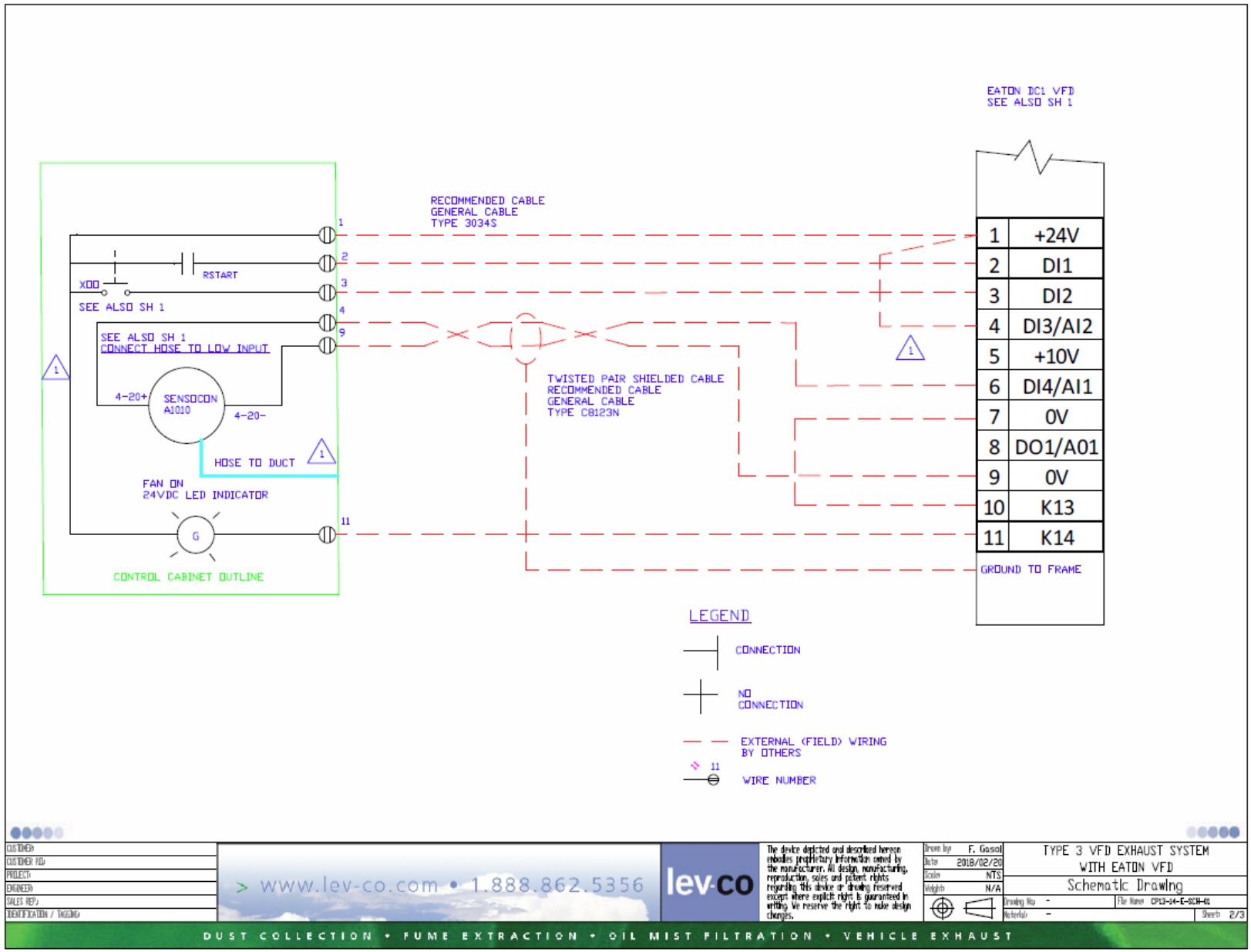
Drawn by: F. Gasol
Date: 2016/10/05
Scale: NTS
Weights: N/A
TYPE 3 VFD EXHAUST SYSTEM
WITH ABB VFD
Schematic Drawing
Drawing No: -
File Name: CP13-14-A-SCH-01 R01
Materials: -
Sheets: 2/3
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

4.3.2 Schematic Diagram – Eaton DC1 Drives




EATON DC1 VFD
SEE ALSO SH 1
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
RSTART
X00
SEE ALSO SH 1
SEE ALSO SH 1
CONNECT HOSE TO LOW INPUT
4-20+
SENSOCON
A1010
4-20-
HOSE TO DUCT
FAN ON
24VDC LED INDICATOR
G
CONTROL CABINET OUTLINE
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
1 +24V
2 DI1
3 DI2
4 DI3/AI2
5 +10V
6 DI4/AI1
7 0V
8 DO1/A01
9 0V
10 K13
11 K14
GROUND TO FRAME
LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11 WIRE NUMBER
CUSTOMER:
CUSTOMER P.O.:
PROJECT:
ENGINEER:
SALES REP.:
IDENTIFICATION / TAGGING:
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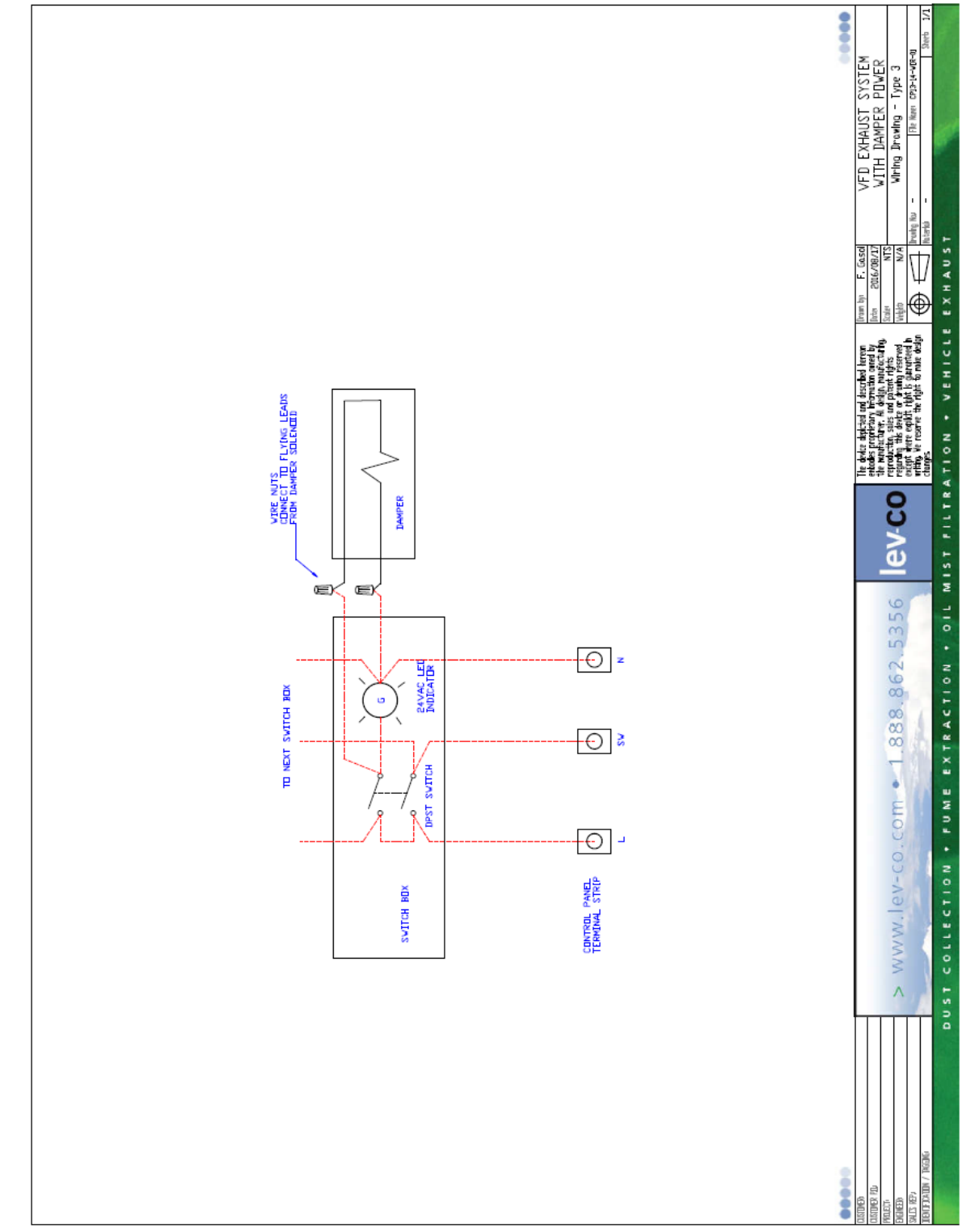
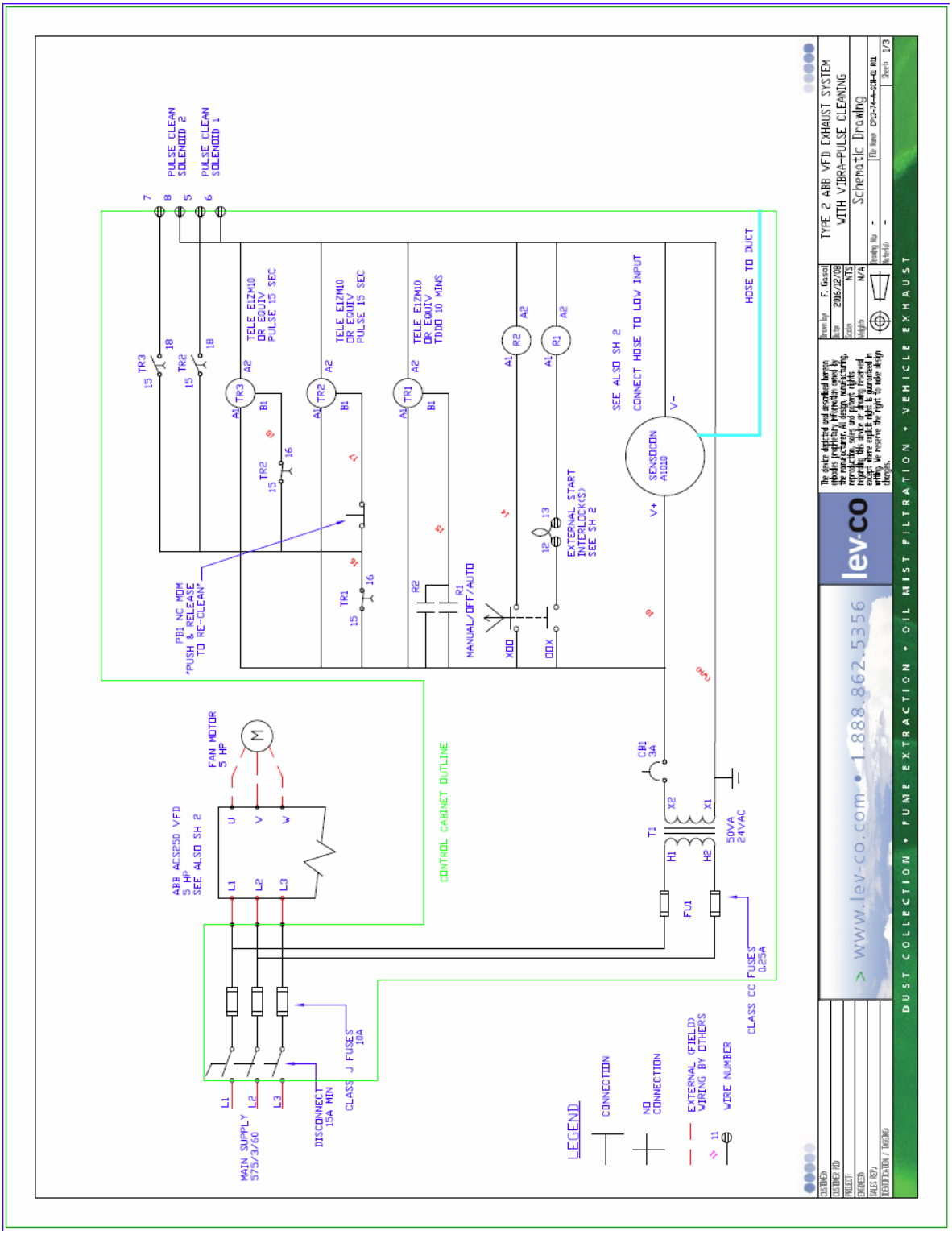
Date: 2018/02/20
Scale: NTS
Weight: N/A
Drawing No: -
Material: -
TYPE 3 VFD EXHAUST SYSTEM
WITH EATON VFD
Schematic Drawing
File Name: CP13-14-E-SCH-01
Sheet: 2/3
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

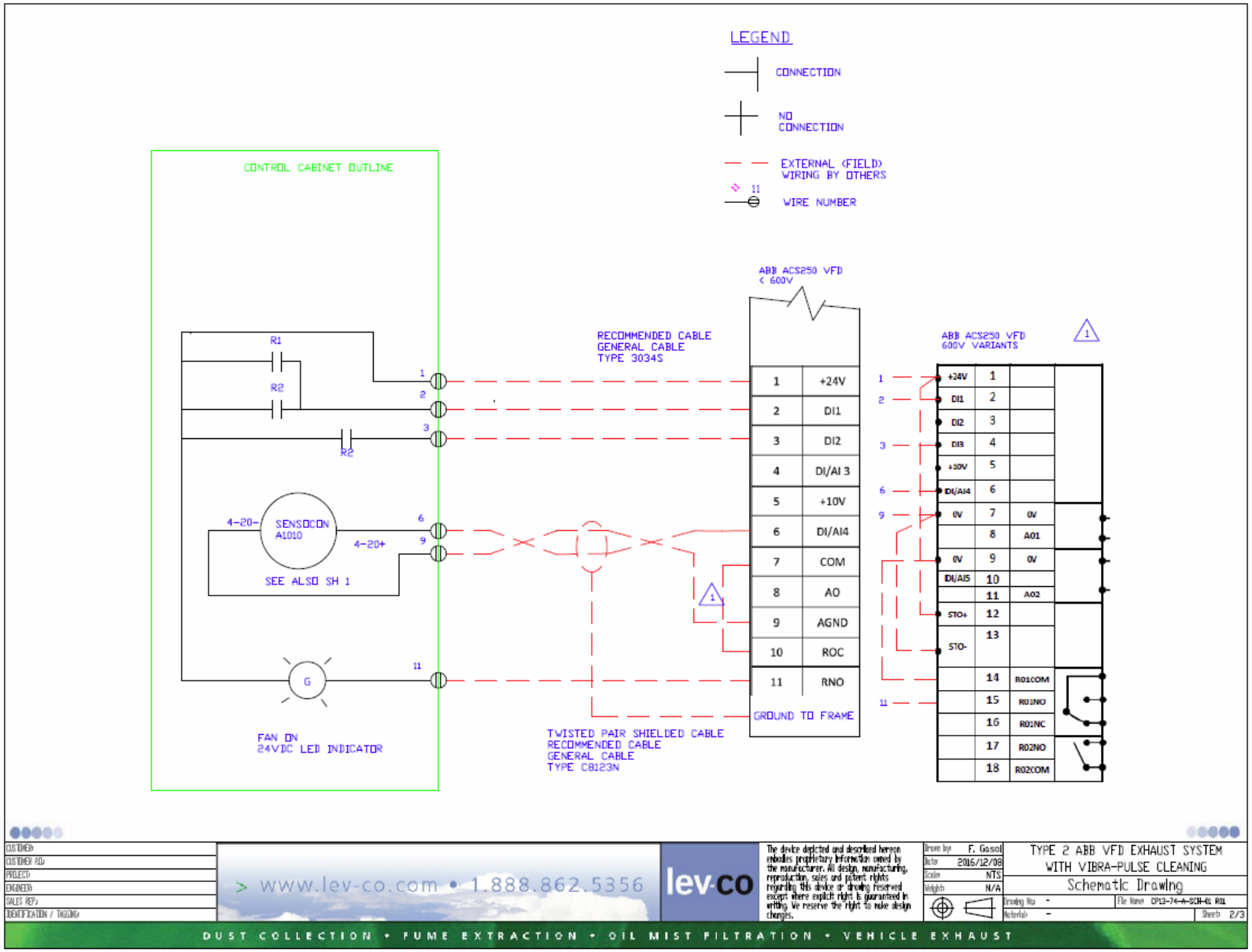
4.3.3 Type 3 Field Wiring



4.4 Model 13-74 – Type 2 System with Vibra-Pulse Cleaning

4.4.1 Schematic Diagram – ABB ACS250 and 600V Variant Drives




LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
CONTROL CABINET OUTLINE
ABB ACS250 VFD < 600V
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
ABB ACS250 VFD 600V VARIANTS
R1
R2
R2
4-20-
SENSOCON A1010
4-20+
SEE ALSO SH 1
G
FAN ON
24VDC LED INDICATOR
1 +24V
2 DI1
3 DI2
4 DI/AI 3
5 +10V
6 DI/AI4
7 COM
8 AO
9 AGND
10 ROC
11 RNO
GROUND TO FRAME
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
+24V 1
DI1 2
DI2 3
DI3 4
+10V 5
DI/AI4 6
0V 7
0V
8 AO1
0V 9
0V
DI/AI5 10
11 AO2
STO+ 12
STO- 13
14 R01COM
15 R01NO
16 R01NC
17 R02NO
18 R02COM
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PROJECT
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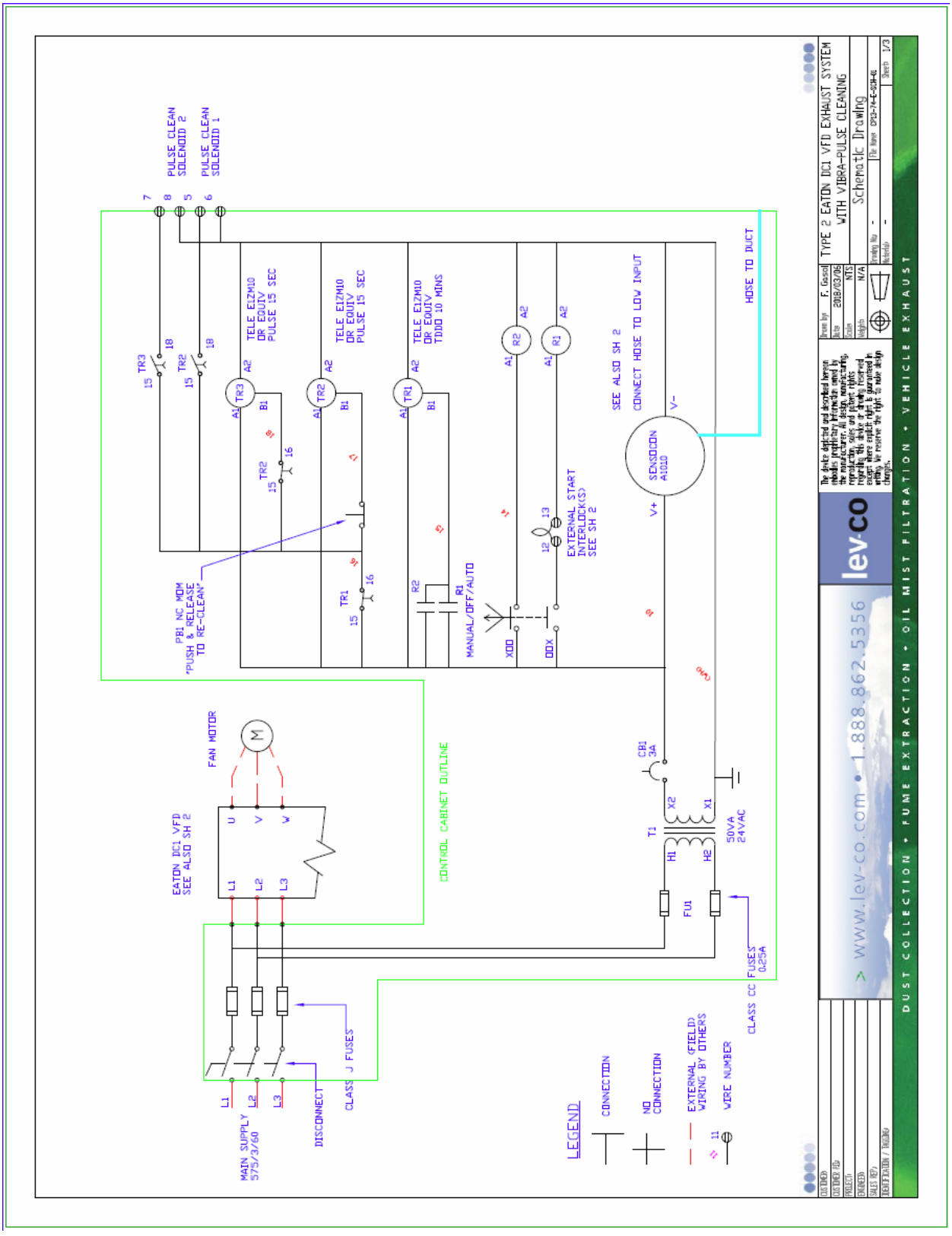
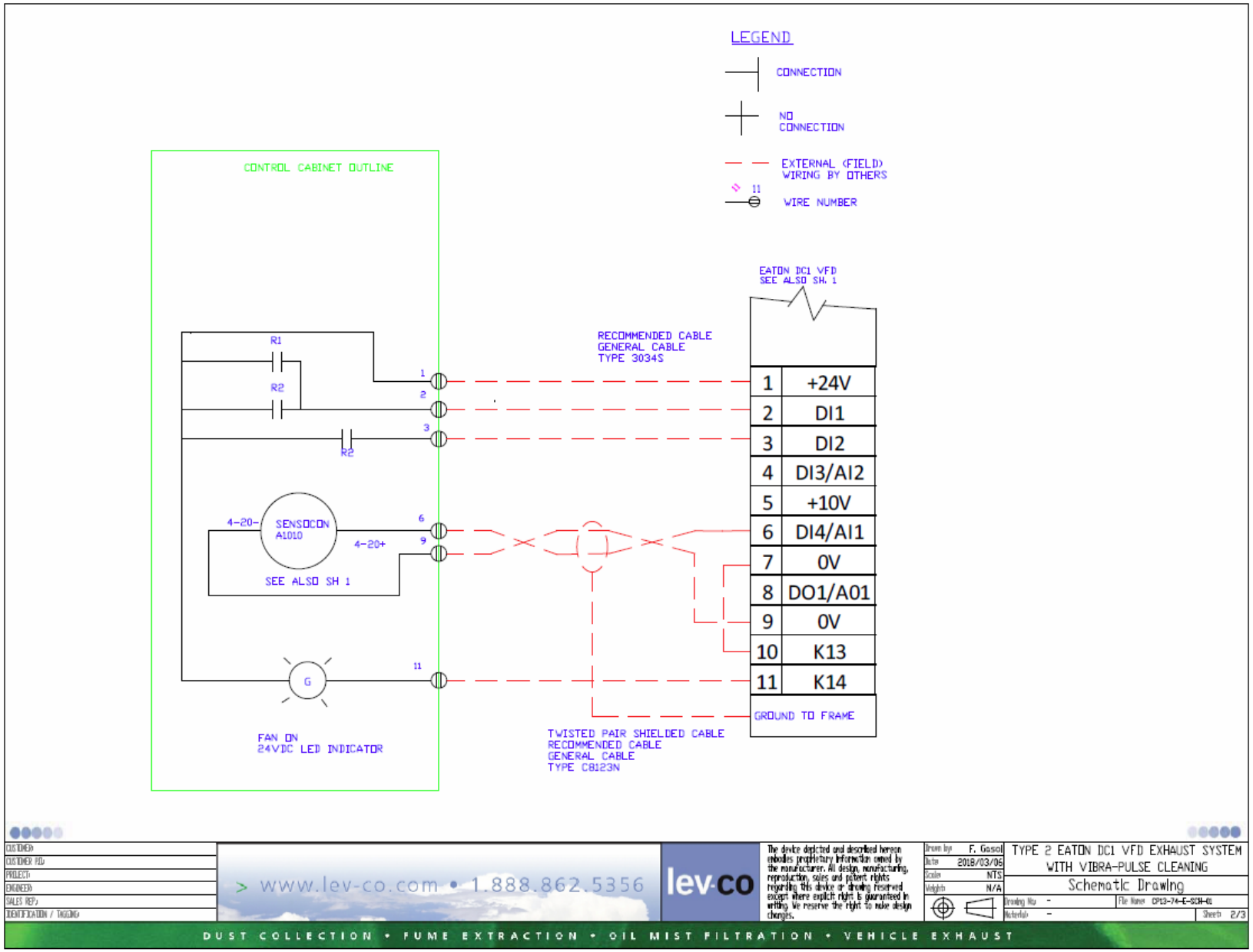
Drawn by F. Gasoli
Date 2016/12/08
Scale NTS
Weight N/A
TYPE 2 ABB VFD EXHAUST SYSTEM
WITH VIBRA-PULSE CLEANING
Schematic Drawing
Drawing No -
File Name CP13-74-A-SCH-01 R01
Material -
Sheet 2/3
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

4.4.2 Schematic Diagram – Eaton DC1 Drives




LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
CONTROL CABINET OUTLINE
EATON DC1 VFD
SEE ALSO SH. 1
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
R1
R2
R2
1
2
3
4-20-
SENSOCON
A1010
4-20+
6
9
SEE ALSO SH 1
G
11
FAN ON
24VDC LED INDICATOR
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
1 +24V
2 DI1
3 DI2
4 DI3/AI2
5 +10V
6 DI4/AI1
7 0V
8 DO1/A01
9 0V
10 K13
11 K14
GROUND TO FRAME
CUSTOMER:
CUSTOMER P.O.:
PROJECT:
ENGINEER:
SALES REP.:
IDENTIFICATION / TAGGING:
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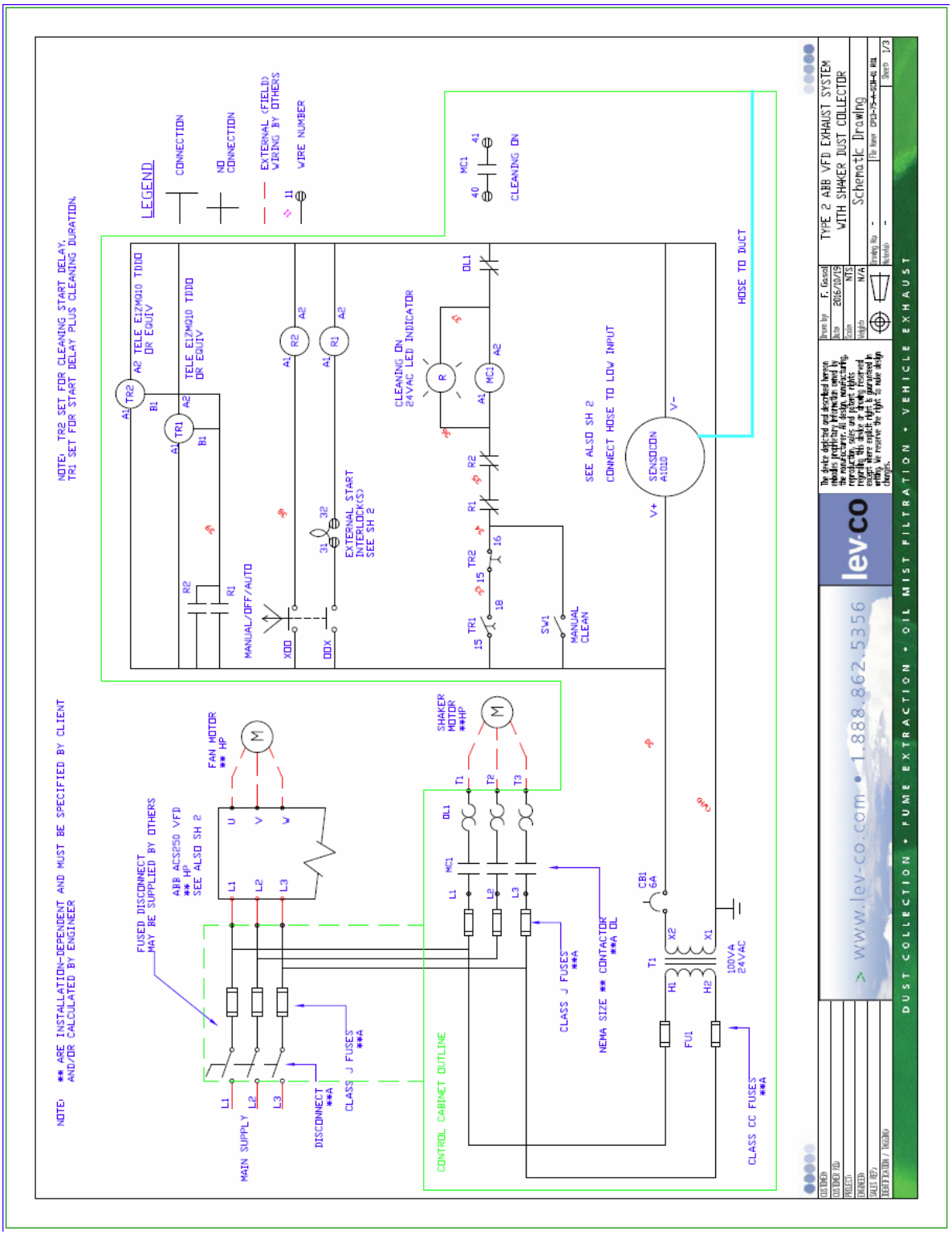
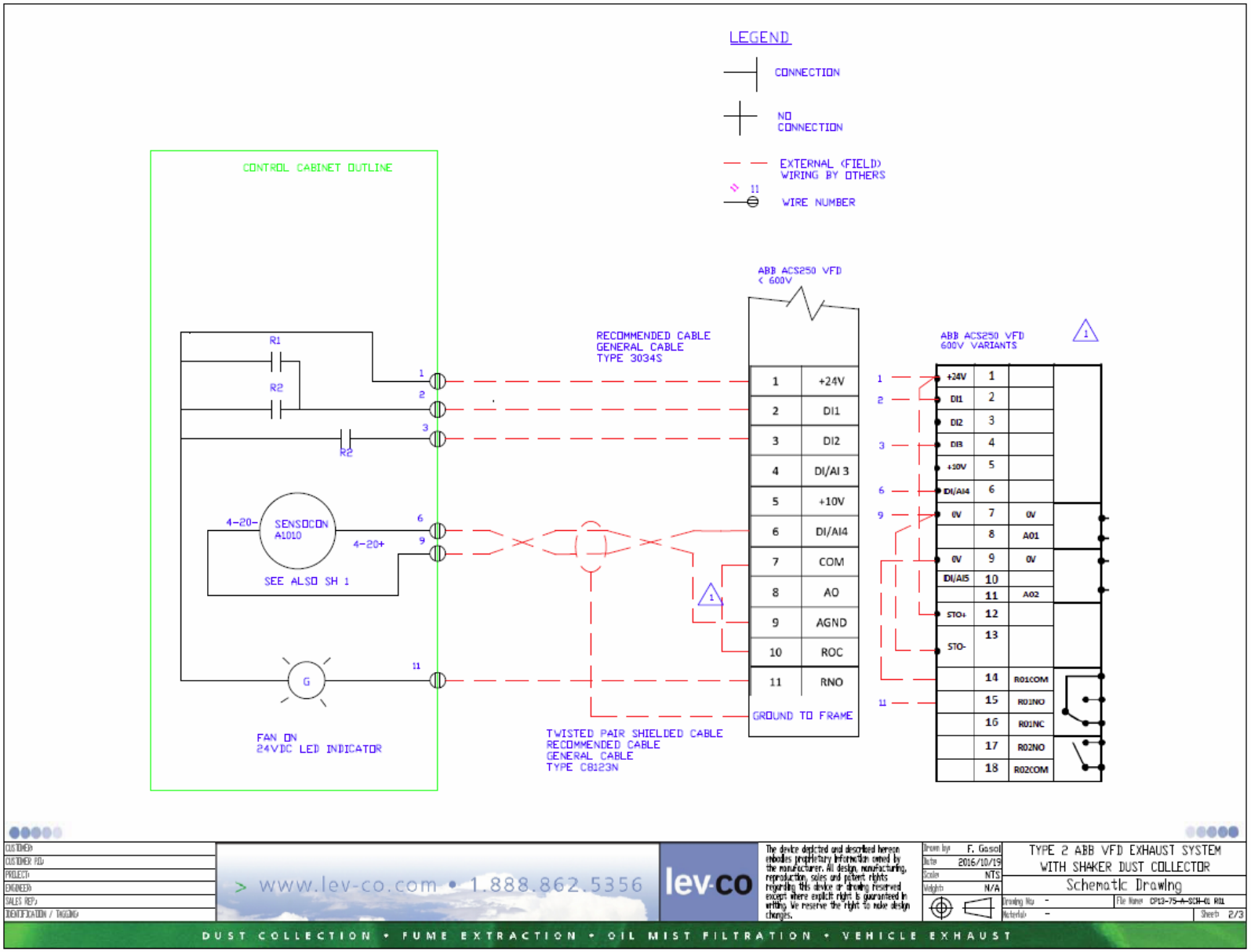
Drawn by: F. Gasol
Date: 2018/03/06
Scale: NTS
Weight: N/A
TYPE 2 EATON DC1 VFD EXHAUST SYSTEM WITH VIBRA-PULSE CLEANING
Schematic Drawing
Drawing No.: -
File Name: CP13-74-E-SCH-01
Material: -
Sheet: 2/3
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

4.5 Model 13-75 – Type 2 System with Shaker Motor Cleaning

4.5.1 Schematic Diagram – ABB ACS250 and 600V Variant Drives




LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
CONTROL CABINET OUTLINE
R1
R2
R2
4-20-
SENSOCON A1010
4-20+
SEE ALSO SH 1
G
FAN ON
24VDC LED INDICATOR
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
ABB ACS250 VFD
< 600V
1 +24V
2 DI1
3 DI2
4 DI/AI 3
5 +10V
6 DI/AI4
7 COM
8 AO
9 AGND
10 ROC
11 RNO
GROUND TO FRAME
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
ABB ACS250 VFD
600V VARIANTS
+24V 1
DI1 2
DI2 3
DI3 4
+10V 5
DI/AI4 6
0V 7
0V
AO1
0V 9
0V
DI/AI5 10
AO2
STO+ 12
STO- 13
14 R01COM
15 R01NO
16 R01NC
17 R02NO
18 R02COM
CUSTOMER
CUSTOMER P.O.
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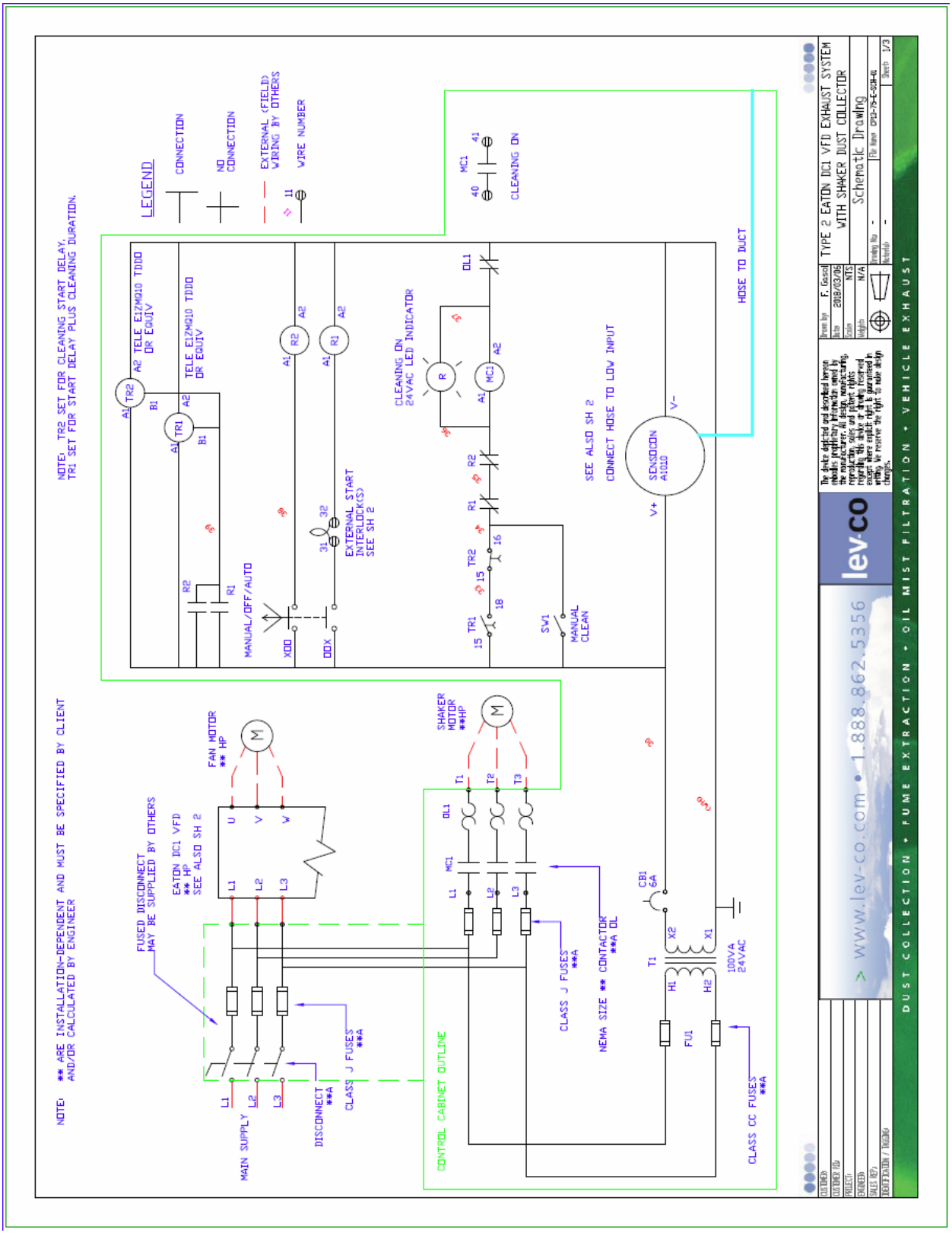
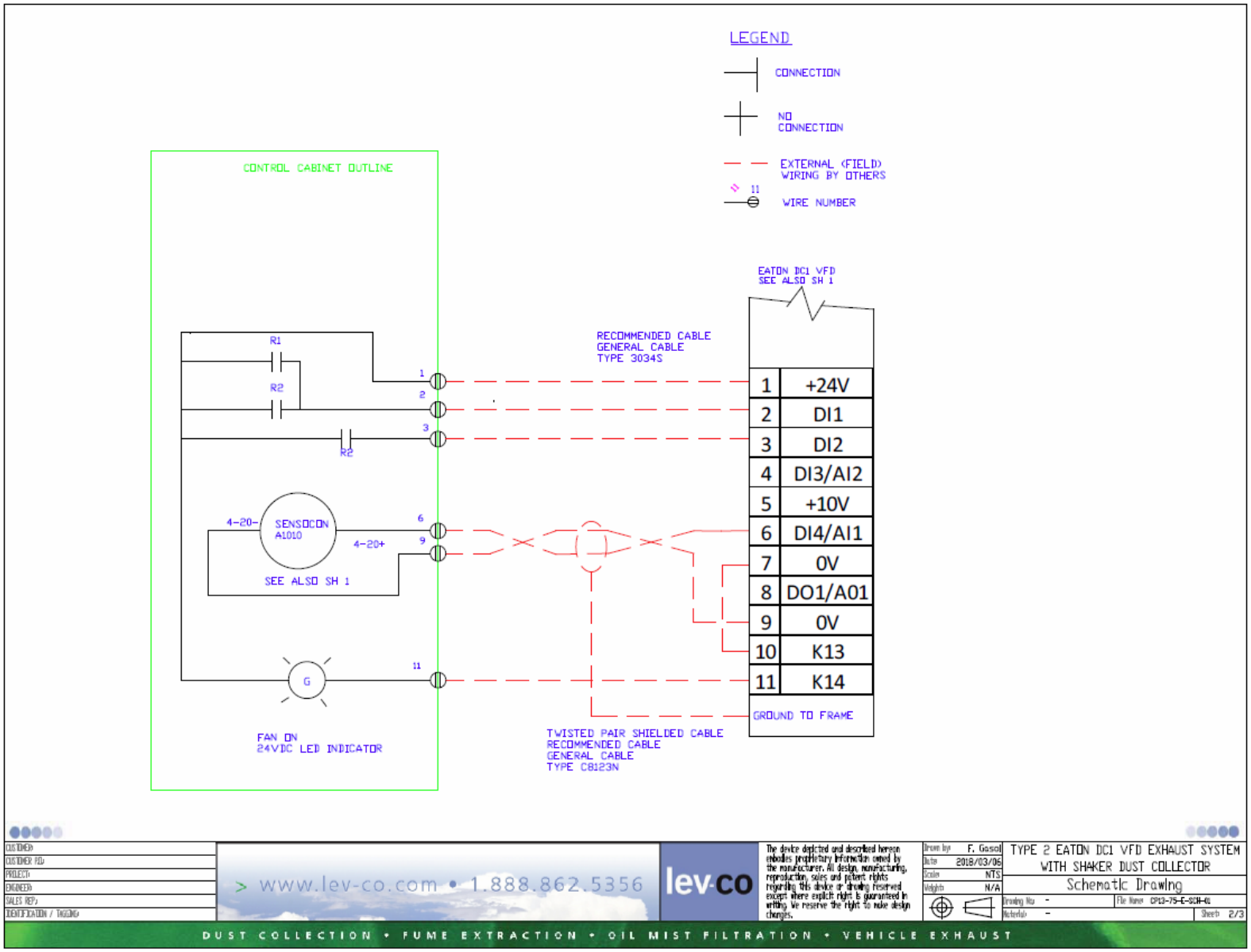
Drawn by F. Gasol
Date 2016/10/19
Scale NTS
Weight N/A
TYPE 2 ABB VFD EXHAUST SYSTEM
WITH SHAKER DUST COLLECTOR
Schematic Drawing
Drawing No -
File Name CP13-75-A-SCH-01 R01
Material -
Sheet 2/3
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

4.5.2 Schematic Diagram – Eaton DC1 Drives




LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
CONTROL CABINET OUTLINE
EATON DC1 VFD
SEE ALSO SH 1
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
R1
R2
R2
1
2
3
4-20-
SENSOCON
A1010
4-20+
6
9
SEE ALSO SH 1
G
11
FAN ON
24VDC LED INDICATOR
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
1 +24V
2 DI1
3 DI2
4 DI3/AI2
5 +10V
6 DI4/AI1
7 0V
8 DO1/A01
9 0V
10 K13
11 K14
GROUND TO FRAME
CUSTOMER
CUSTOMER P.O.
PROJECT
ENGINEER
SALES REP
IDENTIFICATION / TAGGING
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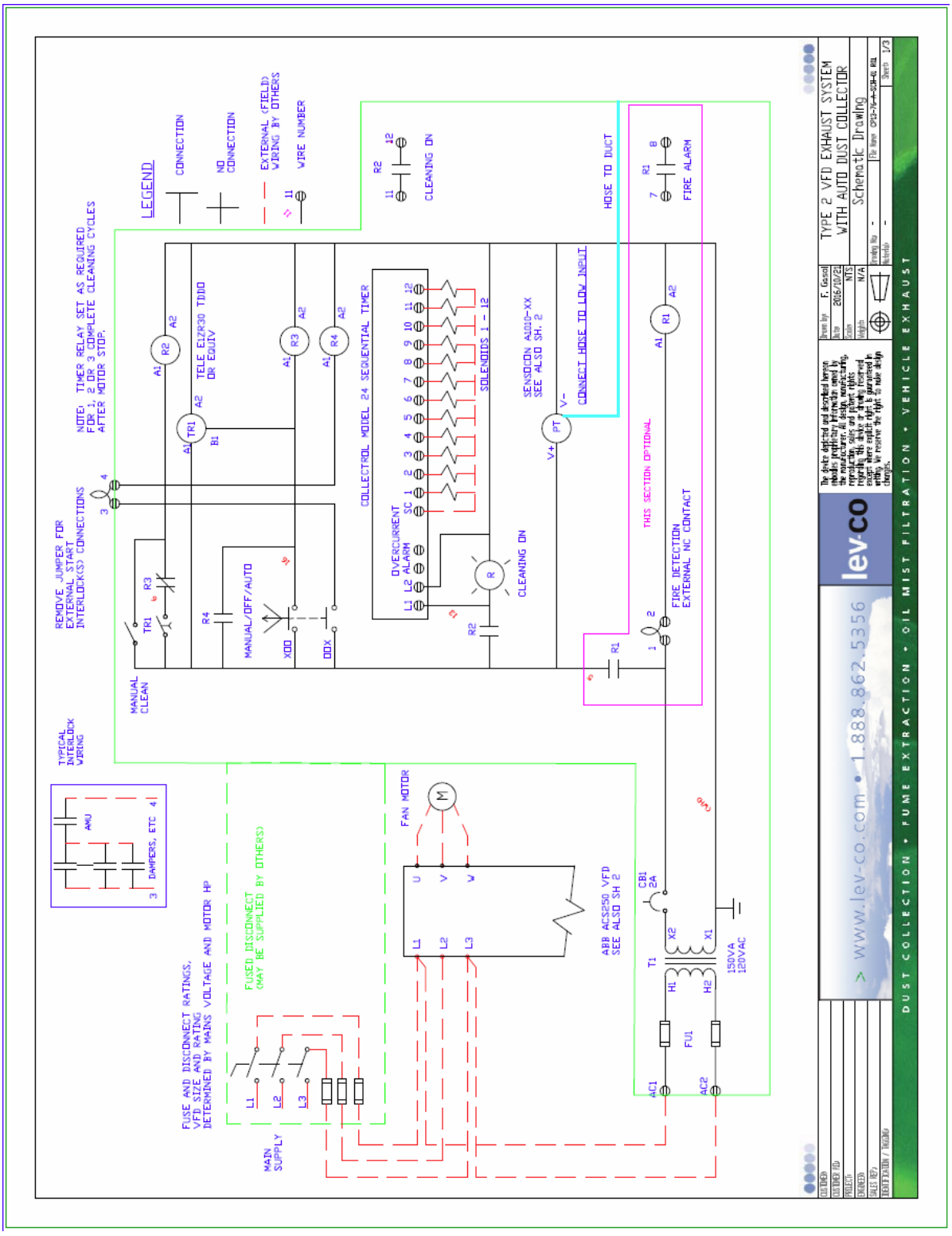
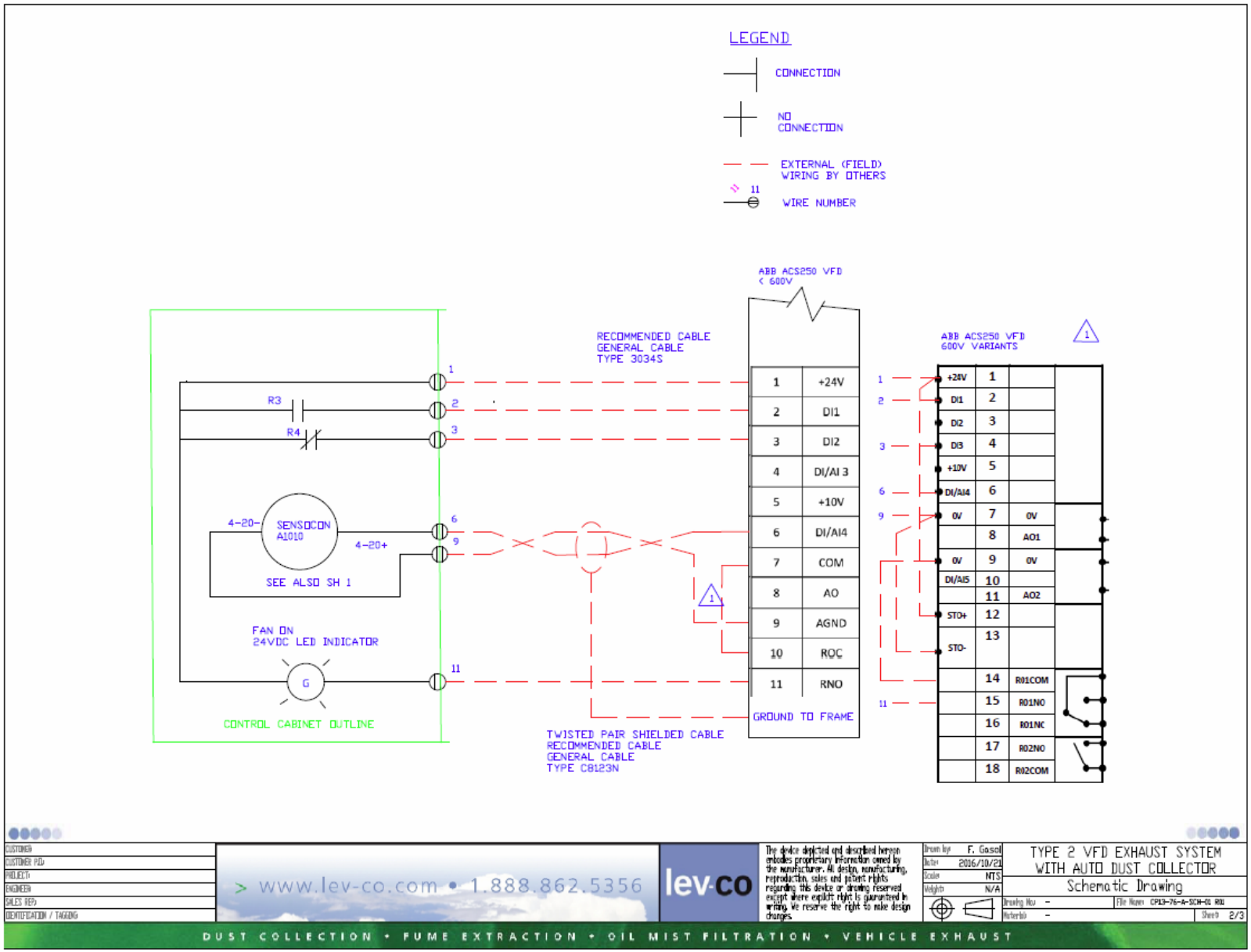
Drawn by F. Gassol
Date 2018/03/06
Scale NTS
Weight N/A
TYPE 2 EATON DC1 VFD EXHAUST SYSTEM
WITH SHAKER DUST COLLECTOR
Schematic Drawing
Drawing No -
File Name CP13-75-E-SCH-01
Material -
Sheet 2/3
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

4.6 Model 13-76 – Type 2 System with Collectrol Solenoids Cleaning

4.6.1 Schematic Diagram – ABB ACS250 and 600V Variant Drives




LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
ABB ACS250 VFD < 600V
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
ABB ACS250 VFD 600V VARIANTS
R3
R4
4-20-
SENSOCON A1010
4-20+
SEE ALSO SH 1
FAN ON
24VDC LED INDICATOR
G
CONTROL CABINET OUTLINE
1 +24V
2 DI1
3 DI2
4 DI/AI 3
5 +10V
6 DI/AI4
7 COM
8 AO
9 AGND
10 ROC
11 RNO
GROUND TO FRAME
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
+24V
DI1
DI2
DI3
+10V
DI/AI4
0V
AO1
0V
DI/AI5
AO2
STO+
STO-
R01COM
R01NO
R01NC
R02NO
R02COM
CUSTOMER
CUSTOMER P.O.
PROJECT
ENGINEER
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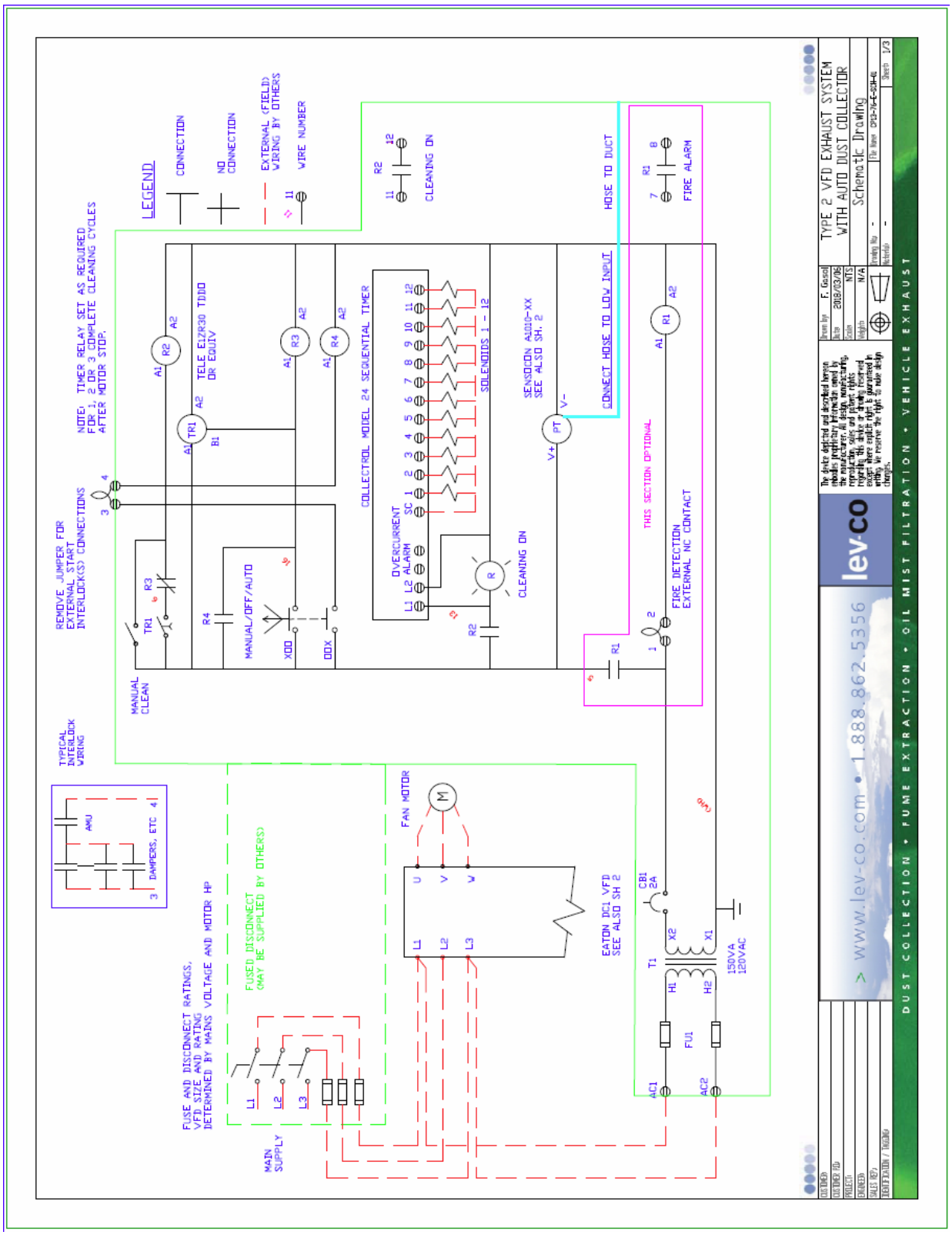
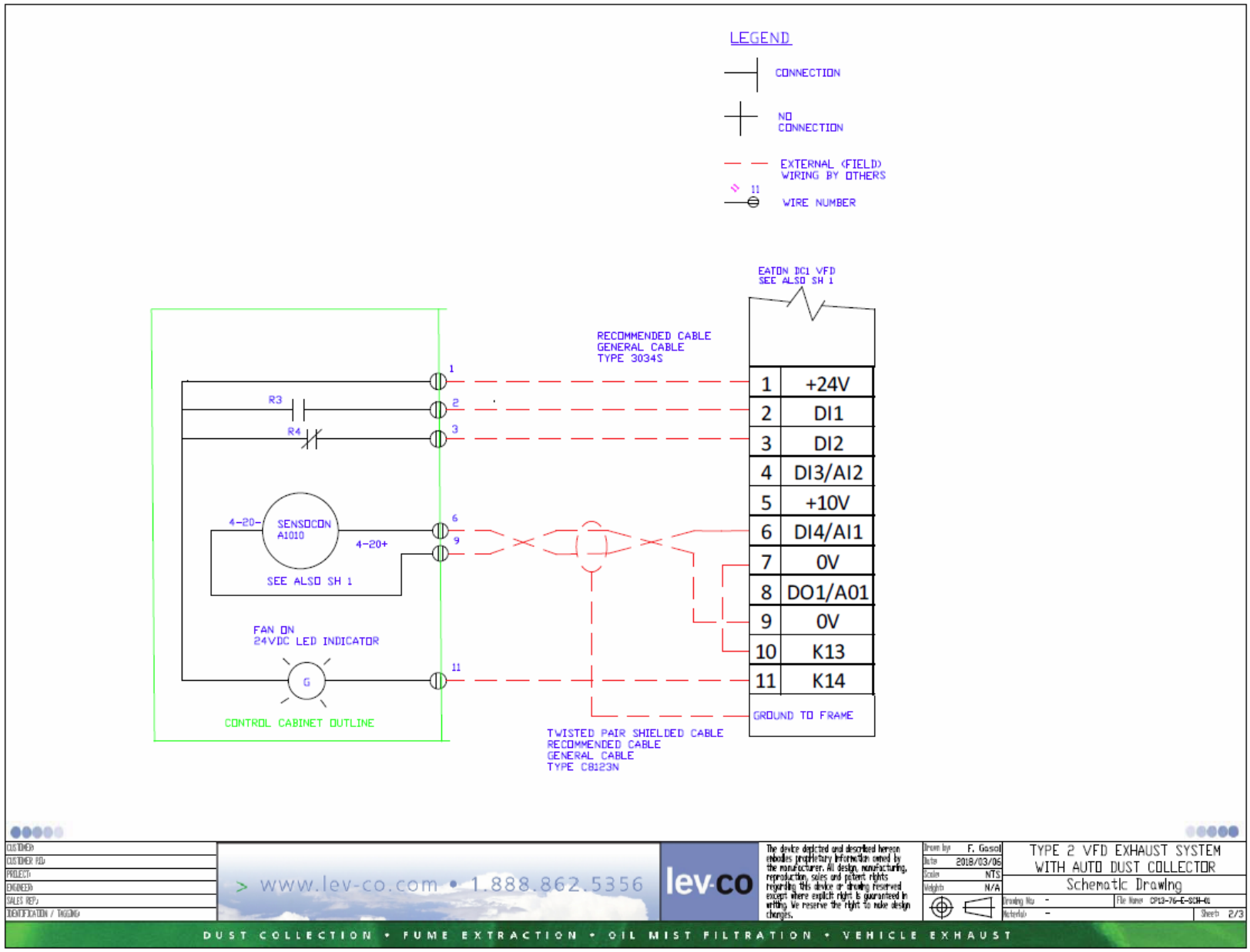
Drawn by F. Gosel
Date 2016/10/21
Scale NTS
Weight N/A
TYPE 2 VFD EXHAUST SYSTEM WITH AUTO DUST COLLECTOR
Schematic Drawing
Drawing No -
File Name CP19-76-A-SCH-01 R01
Material -
Sheet 2/3
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

4.6.2 Schematic Diagram – Eaton DC1 Drives




LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
EATON DC1 VFD
SEE ALSO SH 1
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
R3
R4
4-20-
SENSOCON
A1010
4-20+
SEE ALSO SH 1
FAN ON
24VDC LED INDICATOR
G
CONTROL CABINET OUTLINE
1 +24V
2 DI1
3 DI2
4 DI3/AI2
5 +10V
6 DI4/AI1
7 0V
8 DO1/A01
9 0V
10 K13
11 K14
GROUND TO FRAME
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
CUSTOMER:
CUSTOMER P/O:
PROJECT:
ENGINEER:
SALES REP:
IDENTIFICATION / TAGGING:
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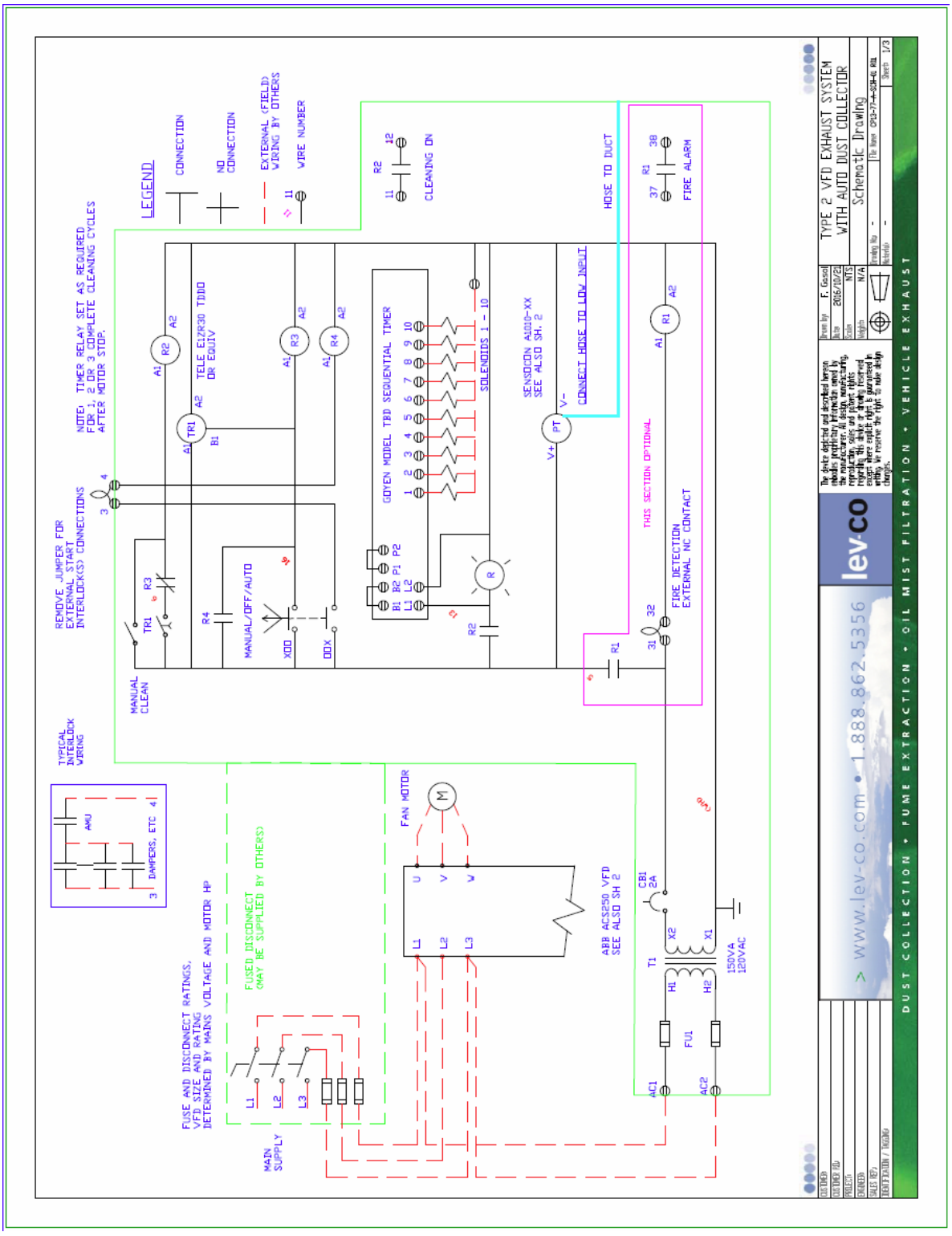
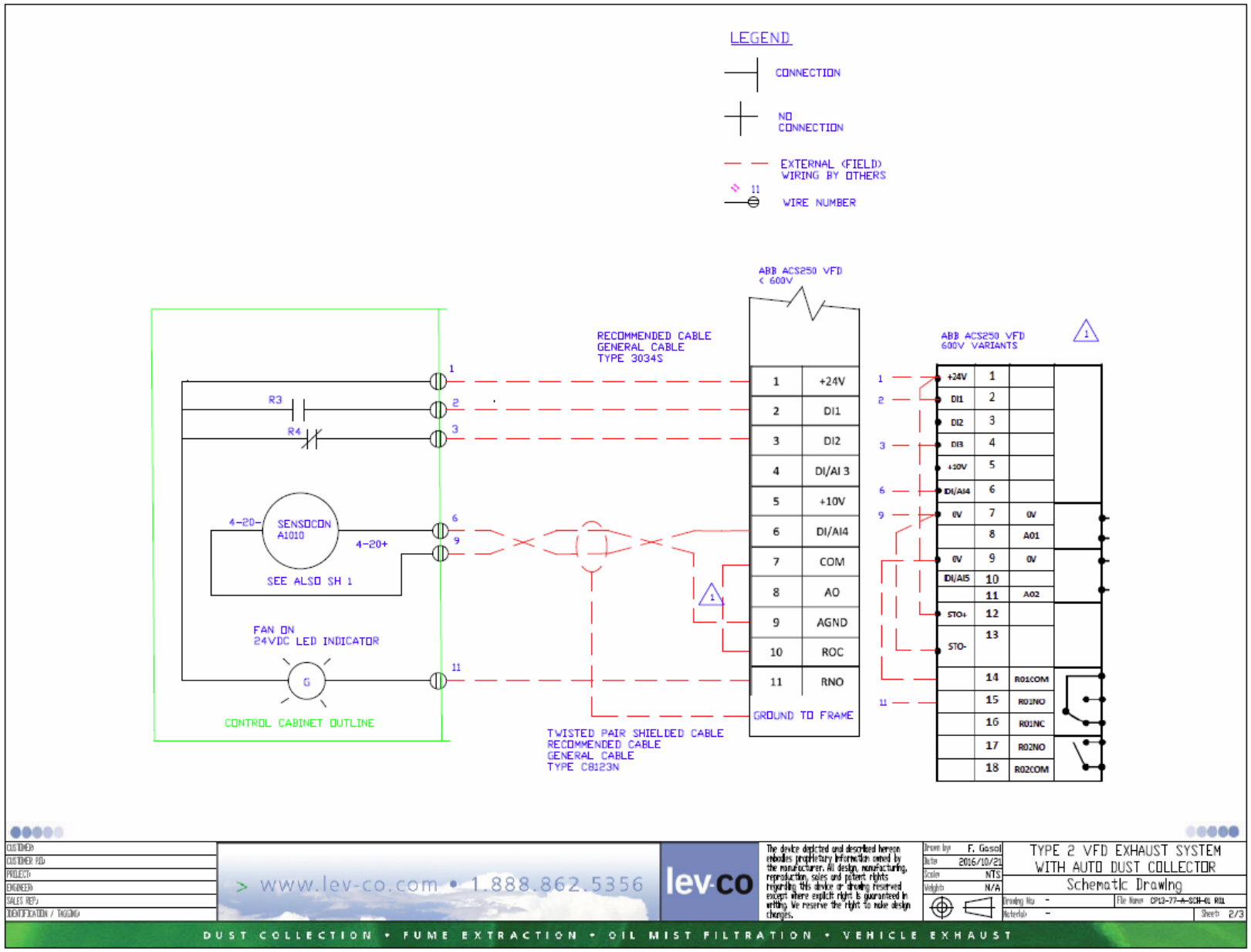
Date: 2018/03/06
Scale: NTS
Weight: N/A
Drawing No: -
Material: -
File Name: CP13-76-E-SCH-01
Sheet: 2/3
TYPE 2 VFD EXHAUST SYSTEM
WITH AUTO DUST COLLECTOR
Schematic Drawing
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

4.7 Model 13-77 – Type 2 System with Goyen Solenoids Cleaning

4.7.1 Schematic Diagram – ABB ACS250 and 600V Variant Drives




LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
ABB ACS250 VFD < 600V
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
ABB ACS250 VFD 600V VARIANTS
R3
R4
4-20-
SENSOCON A1010
4-20+
SEE ALSO SH 1
FAN ON
24VDC LED INDICATOR
G
CONTROL CABINET OUTLINE
1 +24V
2 DI1
3 DI2
4 DI/AI 3
5 +10V
6 DI/AI4
7 COM
8 AO
9 AGND
10 ROC
11 RNO
GROUND TO FRAME
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
+24V 1
DI1 2
DI2 3
DI3 4
+10V 5
DI/AI4 6
0V 7
AO1 8
0V 9
DI/AI5 10
AO2 11
STO+ 12
STO- 13
R01COM 14
R01NO 15
R01NC 16
R02NO 17
R02COM 18
TYPE 2 VFD EXHAUST SYSTEM WITH AUTO DUST COLLECTOR
Schematic Drawing
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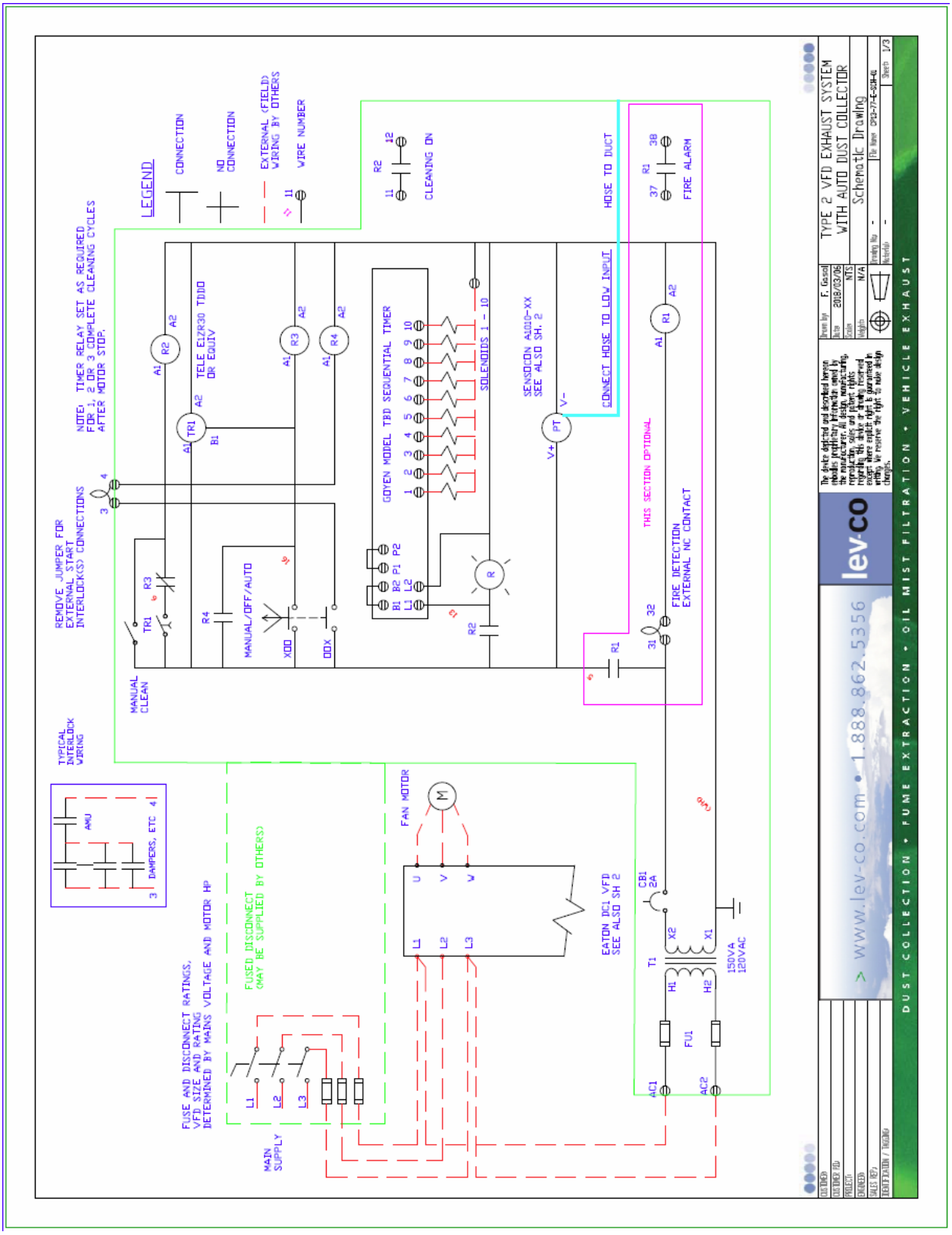
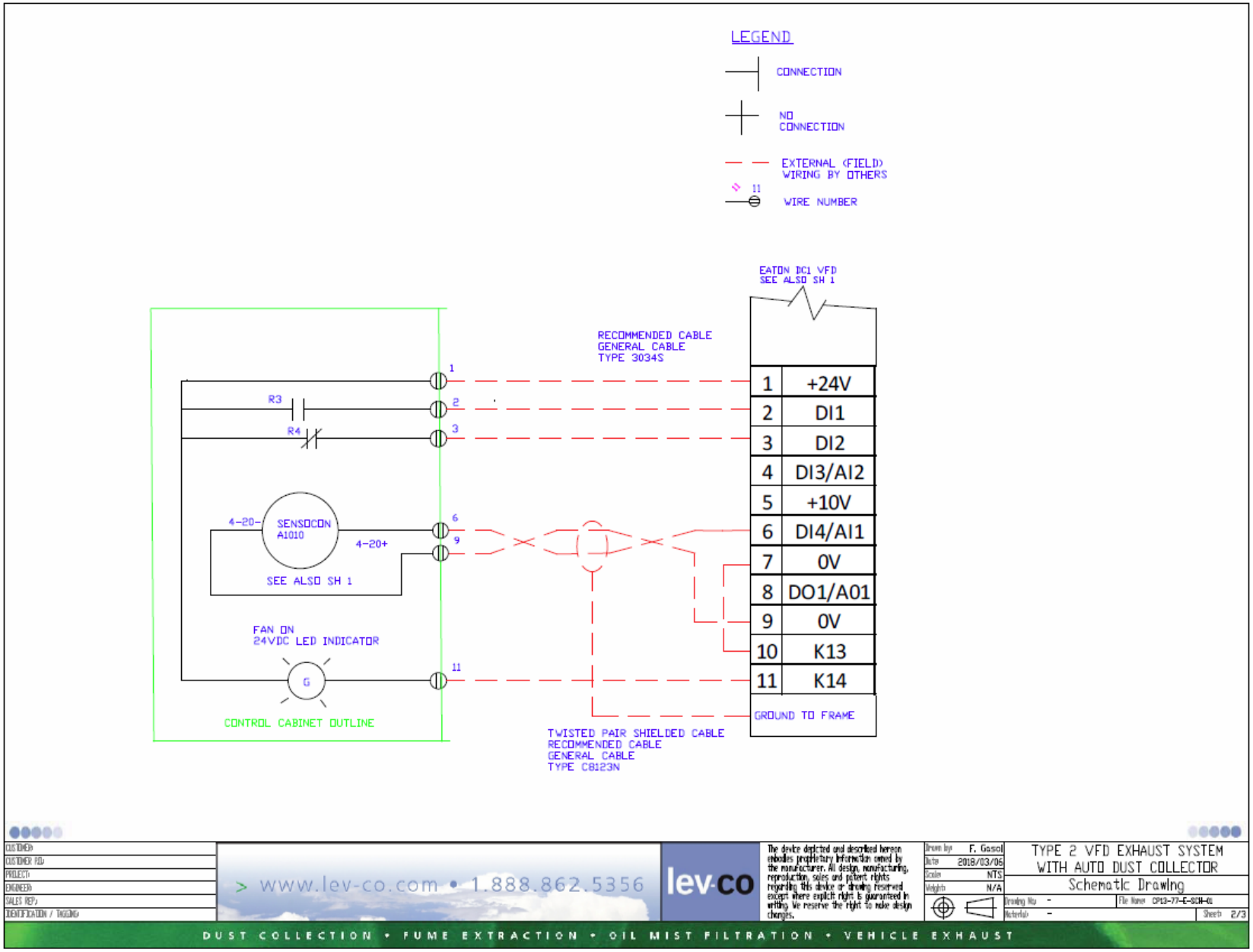
4.7.2 Schematic Diagram – Eaton DC1 Drives




LEGEND
CONNECTION
NO CONNECTION
EXTERNAL (FIELD) WIRING BY OTHERS
11
WIRE NUMBER
EATON DC1 VFD
SEE ALSO SH 1
RECOMMENDED CABLE
GENERAL CABLE
TYPE 3034S
R3
R4
4-20-
SENSOCON A1010
4-20+
SEE ALSO SH 1
FAN ON
24VDC LED INDICATOR
G
CONTROL CABINET OUTLINE
1 +24V
2 DI1
3 DI2
4 DI3/AI2
5 +10V
6 DI4/AI1
7 0V
8 DO1/A01
9 0V
10 K13
11 K14
GROUND TO FRAME
TWISTED PAIR SHIELDED CABLE
RECOMMENDED CABLE
GENERAL CABLE
TYPE C8123N
CUSTOMER:
CUSTOMER P.O.:
PROJECT:
ENGINEER:
SALES REP.:
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Drawn by: F. Gasol
Date: 2018/03/06
Scale: NTS
Weight: N/A
Drawing No: -
Material: -
File Name: CP13-77-E-SCH-01
Sheet: 2/3
TYPE 2 VFD EXHAUST SYSTEM WITH AUTO DUST COLLECTOR
Schematic Drawing
DUST COLLECTION • FUME EXTRACTION • OIL MIST FILTRATION • VEHICLE EXHAUST

4.8 Run Lists, Wiring Diagrams and Drive Programming – Models 13-13/14/74/75/76/77

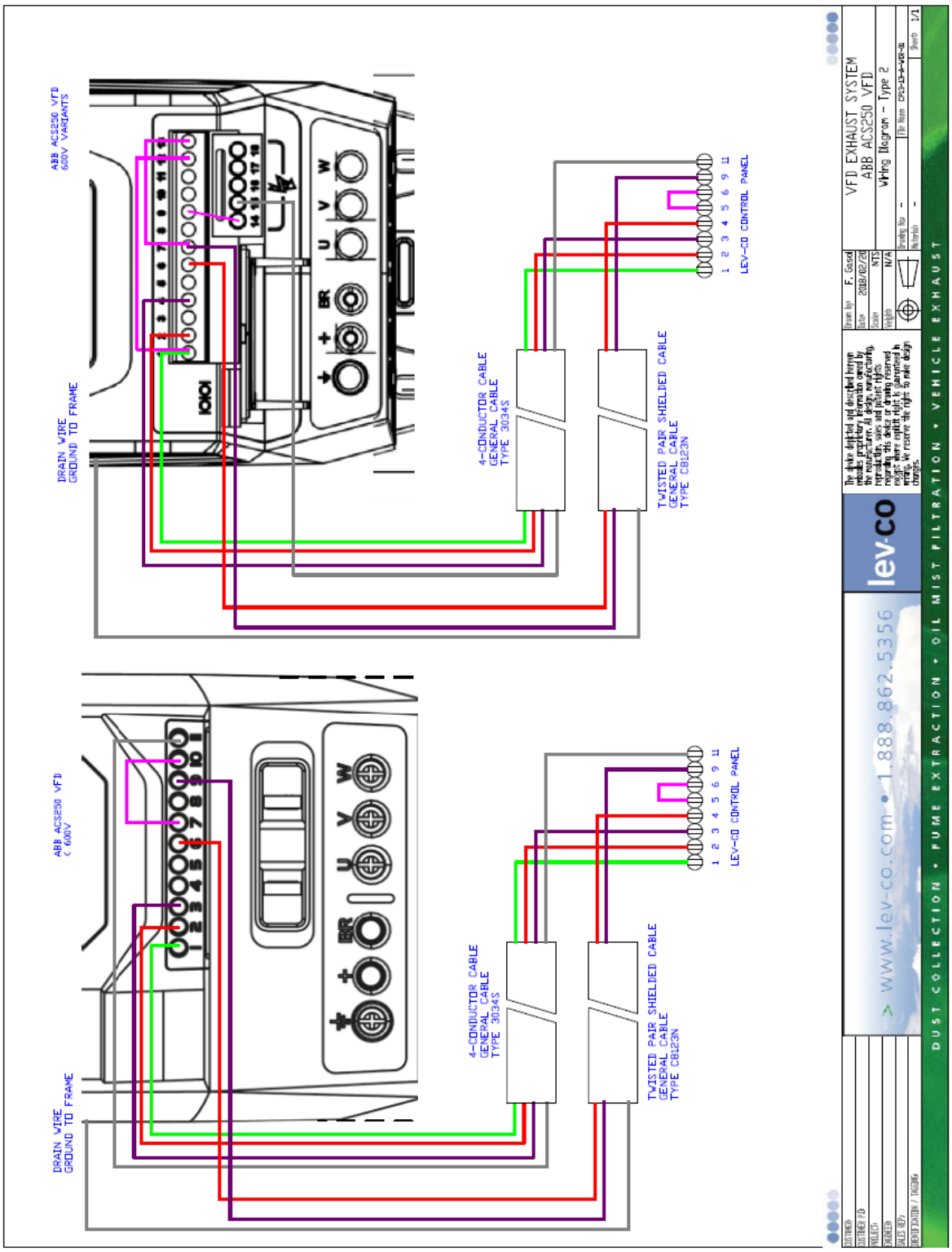
4.8.1 Run List – ABB ACS250 Drives

CABLE	COLOUR	FROM	TO
4-conductor	GREEN	Control Panel 1	VFD 1
4-conductor	RED	Control Panel 2	VFD 2
4-conductor	WHITE	Control Panel 3	VFD 3
4-conductor	BLACK	Control Panel 11	VFD 11
STP	RED	Control Panel 4	VFD 6
STP	BLACK	Control Panel 9	VFD 9
STP	SHIELD	N/C	VFD frame
		VFD 7	VFD 10

4.8.2 Run List – ABB ACS250 Drives – 600V Variants

CABLE	COLOUR	FROM	TO
4-conductor	GREEN	Control Panel 1	VFD 1
4-conductor	RED	Control Panel 2	VFD 2
4-conductor	WHITE	Control Panel 3	VFD 4
4-conductor	BLACK	Control Panel 11	VFD 15
STP	RED	Control Panel 4	VFD 6
STP	BLACK	Control Panel 9	VFD 7
STP	SHIELD	N/C	VFD frame
		VFD 1	VFD 12
		VFD 7	VFD 13
		VFD 9	VFD 14

4.8.3 Wiring Diagram – ABB ACS250 and 600V Variant Drives



4.8.4 Drive Programming – ABB ACS250 Drives and 600V Variants

△1 ADDED WIRING FOR 600V VARIANTS
CHANGED PARAMETER 9902 FOR COMPLIANCE WITH 600V VARIANTS
CHANGED PARAMETER 1103 FOR COMPLIANCE WITH 600V VARIANTS
CORRECTED WIRING ERROR WAS PIN 4 IS PIN 6
2017-12-12 FG

△2 ADDED PRESSURE HOSE
REVISED SWITCH REPRESENTATION
UPDATED PARAMETER SETTINGS
2018-07-25 FG

Lev-Co Parameters Setup for Type 2/3 ABB ACS250 VFD Systems

△2 Parameters which are left at factory default are not listed. However, making a comprehensive list of all parameters is recommended.

Code	Description	Set To	Units	Meaning	Notes
9902	DIGITAL INPUT FUNCTION SELECT	1			Sets operation of terminals 1 - 4
9905	Motor Nameplate Volts	See Note	Volts		Enter Nameplate Data
9906	Motor Nameplate FLA	See Note	Amps		Enter Nameplate Data
9908	Motor Rated Speed	0	RPM		Leaves parameters in Hz
1103	PRIMARY COMMAND SOURCE MODE	SEE NOTE 1 BELOW		PI CONTROL	Sets PID Mode
1202	Constant Speed 1	60	Hz	Full Speed	Sets speed for MANUAL Mode
1300	ANALOG INPUT 1 SIGNAL FORMAT	r4-20		4 - 20mA	
1401	OUTPUT RELAY FUNCTION SELECT	0		FAN ON Signal	
2007	MINIMUM FREQUENCY	20	Hz		Minimum for motor cooling
2202	ACCELERATION TIME 1	See Note	sec	Ramp up time	Set as desired. Typ = 30 secs
2203	DECELERATION TIME 2	See Note	sec	Ramp down time	Set as desired. Typ = 30 secs
4011	PI LOOP TARGET	See Note	%	AUTO Mode Target Pressure	Adjust for desired duct pressure - see note 2 below

Notes

1 Set to 5 for standard drive types. Set to 3 for 600V variants

2 Parameter 4011 should initially be set for 50%. Based on the resulting duct pressure, it can then be adjusted to give the desired duct pressure. For example, if 50% speed gives 4 inWC and the desired value is 7 inWC, then we set 4011 to 7/4 x 50 = 87.5%. Note that this is somewhat non-linear and may require some experimentation.

VFD SETUP

CUSTOMER:
CUSTOMER P.O.:
PROJECT:
ENGINEER:
SALES REP.:
IDENTIFICATION / TAGGING:

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Drawn by: F. Gasol
Date: 2016/10/05
Scale: NTS
Weights: N/A
Drawing No: -
Materials: -

TYPE 2 VFD EXHAUST SYSTEM
WITH ABB VFD
Schematic Drawing
File Name: CP13-13-A-SCH-01 R01
Sheet: 2/2

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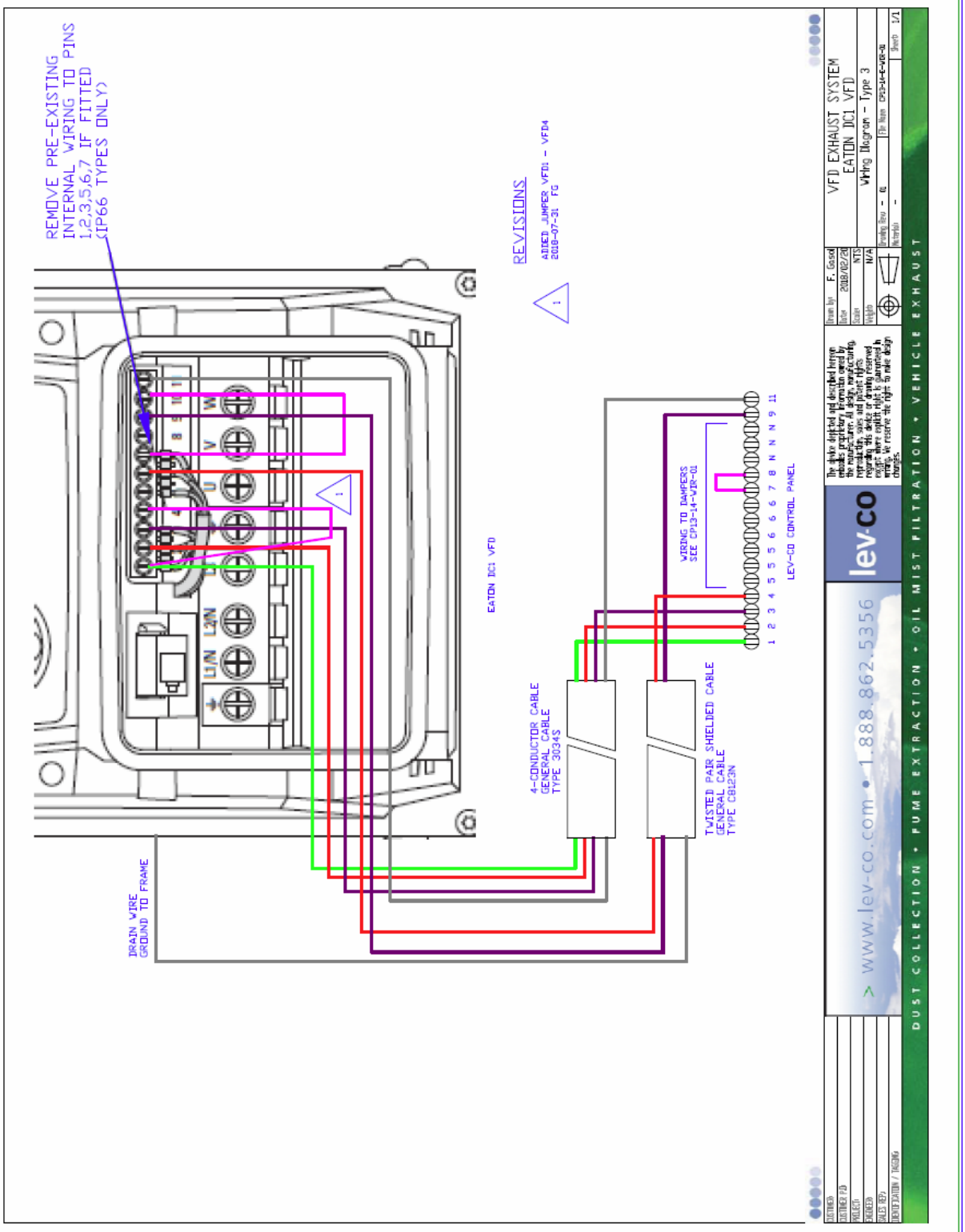
4.8.5 Run List – Eaton DC1 Drives

CABLE	COLOUR	FROM	TO
4-conductor	GREEN	Control Panel 1	VFD 1
4-conductor	RED	Control Panel 2	VFD 2
4-conductor	WHITE	Control Panel 3	VFD 3
4-conductor	BLACK	Control Panel 11	VFD 11
Shielded Twisted Pair	RED	Control Panel 4	VFD 6
Shielded Twisted Pair	BLACK	Control Panel 9	VFD 9
Shielded Twisted Pair	SHIELD	No Connection	VFD frame
JUMPER	ANY	VFD 1	VFD 4
JUMPER	ANY	VFD 7	VFD 10

4.8.6 Wiring Diagram – Eaton DC1 Drives



Lev-Co Parameters Setup for Type2/3 Eaton DC1 VFD Systems

NOTE: Parameters which are not shown are unchanged from default

Code	Description	Set To	Units	Meaning	Default	Notes
P-01	f-max	60	Hz	Drive maximum frequency	50	May be set higher if overspeed operation desired
P-02	f-min	20	Hz	Drive minimum frequency	0	Set for motor cooling
P-03	t-acc	30	sec	Acceleration ramp time	5	May be set as desired. 30 is typical
P-04	t-dec	30	sec	Deceleration ramp time	5	May be set as desired. 30 is typical
P-05	Stop mode	0		Ramp to stop	1	Default is coast to stop
P-07	Motor Voltage	See note	V	Nameplate voltage		Set to motor nameplate voltage
P-08	Motor Current	See note	A	Nameplate current		Set to motor nameplate current
P-09	Motor Frequency	60	Hz	Nameplate frequency	50	
P-10	Motor Speed	0	RPM		0	Leaves parameters in Hz rather than RPM
P-12	Local Process Data Source	5		PID Control	0	Default is terminal control
P-14	Password	101		Enable access to extended parameters	0	
P-15	DI Config Select	3		Configuration of the control signal terminals	5	Functions of digital inputs - see table in Eaton manual
P-16	AI1 range	4		r4-20	0	4-20mA loop - ramp to P20 in case of wire break
P-20	f-FIX1	60	Hz	MANUAL mode operation speed	15	
P-30	Start Mode	0		Auto start	0	Confirm default value
P-31	Digital Reference Reset Mode	1		Start with latest speed before switching off	1	Confirm default value
P-35	AI1 Gain	See note	See note	Scaling of analog input 1	See note	Set to 1 or 100% - varies with VFD firmware rev.
P-41	PID Loop Gain	1		Controller gain	0	
P-42	PID Loop time constant	3	sec	Controller response time	1	Typical setting for well-damped response
P-44	PID1 Set Point 1 Source	0		Digital set point signal, set with P-45	0	Confirm default value
P-45	PID Digital set point	See note	%	Set target speed	0	Adjust for desired duct pressure - see below
P-46	PID feedback source	1		AI1	0	

Parameter P-45 should initially be set for 50%. Based on the resulting duct pressure, it can then be adjusted to give the desired duct pressure.
For example, if 50% speed gives 4 inWC and the desired value is 7 inWC, then we set P-45 to 7/4 x 50 = 87.5%.
Note that this is somewhat non-linear and may require some experimentation.

VFD SETUP