



**DOVER SCHOOL
DISTRICT**

JOINT BUILDING COMMITTEE – GARRISON SCHOOL MEETING NOTICE

Meeting Type:	Regular Meeting
Meeting Location:	Superintendent's Office, McConnell Center
Meeting Date:	Tuesday, February 26, 2019
Meeting Time:	4:30 P.M.

1. Call to Order and Roll Call
2. Citizens' Forum
3. Approval of Agenda
4. Approval of Minutes of February 12, 2019
5. Approval of Change Orders
6. Harriman/Harvey Update
7. Manifest Approval
8. Heating System
9. End of Project Ceremony
10. Committee Financial Report
11. Review Action Items and Build Agenda for next meeting
12. Matters of Interest
13. Adjournment



**DOVER SCHOOL
DISTRICT**

JOINT BUILDING COMMITTEE – GARRISON SCHOOL MINUTES

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Meeting Location:	Supt Conference Room, McConnell Center
Meeting Date:	Tuesday, February 12, 2019
Meeting Time:	4:30 p.m.

- I. CALL TO ORDER AND ROLL CALL:** A meeting of the Garrison School Joint Building Committee was called to order on Tuesday, February 12, 2019 at 4:35 p.m. in the Supt Conference room in the McConnell Center by Chair Dennis Ciotti. In addition to Mr. Ciotti, present JBC members included Karen Weston, and Keith Holt. Steve Haight arrived at 4:40 p.m. and Carolyn Mebert was excused. Also, in attendance were Harriman representative Dan Bisson, Harvey Construction representative Adam Reynolds, Superintendent Bill Harbron, Business Administrator Libby Simmons, Clerk of the Works Stephanie Parsons, IT Director Christy Prosser and Principal Beth Dunton.
- II. CITIZENS' FORUM:** No one addressed the JBC.
- III. APPROVAL OF AGENDA:** Jan Nedelka moved, Karen Weston seconded to approve the agenda as amended moving Switch Discussion to follow approval of meeting minutes. An oral **VOTE PASSED 4/0.**
- IV. APPROVAL OF MEETING MINUTES FOR JANUARY 29, 2019:**
Jan Nedelka moved, Karen Weston seconded to approve meeting minutes of January 29, 2019 as amended changing "Mr. Harriman" to "Mr. Bisson" in the Matters of Interest section of the minutes. An oral **VOTE PASSED 4/0.**
- V. SWITCH (IT) DISCUSSION: moved up in the agenda.** Ms. Prosser summarized the issue stating that a switch in a Garrison closet that was damaged after installation. It cannot be repaired and there are no useful parts. A reserve switch was taken from the high school until a replacement is received. She is requesting a replacement cost of \$2,620.32. Mr. Reynolds commented that he could not establish liability and how it was damaged. He will try and determine the cause of the damage and will report back to the JBC. Ms. Prosser will try and make the racks less accessible in the future
- Jan Nedelka moved, Keith Holt seconded to approve \$2,620.32 for replacement of this switch with funds to come out of contingency. A roll call **VOTE PASSED 5/0.**
- VI. APPROVAL OF CHANGE ORDERS:**
Jan Nedelka moved, Keith Holt seconded to approve PCO #053 in the amount of \$6,239.58 for New CUH's (cabinet unit heaters). A roll call **VOTE PASSED 5/0.**

The 2 current cabinet heaters were not functioning. Ms. Weston requested the school look into whether this is a maintenance issue before the action is completed. Mr. Bisson will check with Mr. Brooks on issues noted with facilities since this wasn't part of Harriman's scope. Ms. Parsons noted that these units were most likely at the end of their life cycle. Ms. Weston agreed but noted that it still needed to be determined if it would come from school maintenance account or the JBC funds. Mr. Ciotti questioned why these were discovered earlier in the project.



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VII. HARRIMAN/HARVEY UPDATE:

Mr. Reynolds stated that everything is going well. Rough MEPs (mechanical, electric and plumbing) are completed. The goal is to have the above ceiling sign offs by February 28. This would allow everything to be put together by April break. Over February break, punch list on twenty wing, draining sprinkler and balance of sprinkler system. They will be circling back to occupied areas to complete punch list items. VCT on the front corridor and data cables to data closets will also be completed during break per Ms. Parsons. They will also start identifying summer projects with remaining funds. There will most likely be a savings in the GMP since they are past the bulk of surprises.

Mr. Bisson stated that the roughing has been done and outside walls are ready to spray form to seal. Everything is progressing well. Extra windows have been installed.

VIII. MANIFEST APPROVAL: Jan Nedelka moved, Keith Holt seconded to approve GES76 to D.M Burns Security in the amount of \$1,100.00 for down payment to relocate rear hallway keypad to security system and relocate motion detectors in suspended tiles. A roll call **VOTE PASSED 5/0.**

Jan Nedelka moved, Keith Holt seconded to approve GES77 to Harvey Construction in the amount of \$264,037.15 for construction services through January 31, 2019. A roll call **VOTE PASSED 5/0.**

IX. HEATING SYSTEMS, INCLUDING AIR LEAK UPDATE: Mr. Bisson updated the JBC on the issues. Items are out for pricing and subject to Unitil rebates. He will provide an additional update at the next JBC meeting. Ms. Parsons added that she asked if the process outlined will fix the issues. She stated the data is now available for what is required to compensate for missing head pressure so she is confident that their design capabilities are able to go backwards now to verify that pressure will be there that is required minus the baseline.

Harvey will try to find a new home for the current pump so that some of the cost may be recouped. Ms. Parsons will check with Mr. Brooks to determine if one of the Dover schools has a need for this pump.

The ducts were sealed fixing the air leaks.

X. COMMITTEE FINANCIAL REPORT: Ms. Simmons reviewed the financial report. She noted that the contingency and unobligated funds is \$187,142.09 with changes made at this meeting. She is working on the reimbursement from the public infrastructure grants for the surveillance systems with Mr. Reynolds. The amount is approximately \$40,000 and she will bring to the School Board for approval and then to the State for their approval. She will contact Eversource to come for the Phase 2 LED lighting rebate which is available now. Mr. Reynolds is waiting to hear from the vendor for heating system invoice which will be approximately \$30,000 with all costs.



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- XI. FINANCIAL AND STATUS UPDATE:** Karen Weston moved, Jan Nedelka moved to approve the financial and status update. A roll call **VOTE PASSED 5/0.**
- XII. DRED UPDATE:** Mr. Ciotti stated that there is no DRED update at this time.
- XIII. REVIEW ACTION ITEMS AND BUILD NEXT AGENDA:** Agenda items include financials, manifests, change orders, heating system, end of project ceremony. The next meeting will be February 26 at the McConnell Center. Mr. Holt will not be in attendance.
- XIV. MATTERS OF INTEREST:** Mr. Holt asked if an opening celebration discussion should be started. Ms. Dunton noted at this point, school is out on June 17 and the project is due to be complete on June 18. She would prefer to know sooner rather than later when this may occur since there are already end of the year items. Mr. Holt suggested asking the culinary program to make a cake for the ceremony.
- Ms. Weston asked about the drainage issue to which Mr. Ciotti responded that one of the city engineers would be looking at the area to survey the issue. Ms. Parsons will also be involved with the discussion.
- Mr. Reynolds asked the JBC to start thinking about what they would like Harvey to be involved in over the summer. He can take a look at general conditions and determine if he may be able to reduce the fee due to reduction in certain costs. Ms. Weston stated that fixing drainage is a priority and they need to make sure that they have enough to cover it. Mr. Reynolds stated his hope to have more firm numbers at the next meeting.
- Mr. Ciotti asked Mr. Reynolds to send him specifications for the basketball hoops that were purchased so he can share with Mr. Bannon and Mr. Storer so that they can make plans when re-doing the parking lot.
- XV. ADJOURNMENT:** Karen Weston moved, Jan Nedelka seconded to adjourn the meeting at 5:40 pm. An oral **VOTE PASSED 5/0.**

HARVEY

Harvey Construction
 10 Harvey Rd
 Bedford, New Hampshire 03110
 Phone: (603) 624-4600
 Fax: 603-668-0389

PCO #055

Project: 2017-006 - Garrison Elem Renov & Addition
 50 Garrison Road
 Dover, New Hampshire 03820

Prime Contract Potential Change Order #055: PR 27R1 - New boiler pump & VFD

TO:	City of Dover 288 Central Ave Dover New Hampshire, 3820	FROM:	Harvey Construction 10 Harvey Road Bedford New Hampshire, 03110
PCO NUMBER/REVISION:	055 / 0	CONTRACT:	1 - Garrison Elem Renov & Addition Prime Contract
STATUS:	Pending - In Review	CREATED BY:	Adam Reynolds (Harvey Construction)
REFERENCE:		CREATED DATE:	2/22 /2019
FIELD CHANGE:	No	PRIME CONTRACT CHANGE ORDER:	None
SCHEDULE IMPACT:		TOTAL AMOUNT:	\$12,026.47

POTENTIAL CHANGE ORDER TITLE: PR 27R1 - New boiler pump & VFD

CHANGE REASON: Existing Condition

POTENTIAL CHANGE ORDER DESCRIPTION: (The Contract Is Changed As Follows)
CE #117 - PR 27 Boiler Pump / VFD

ATTACHMENTS:

OMI CCO Request - Garrison PR-027 REV.pdf

#	Cost Code	Description	Type	Amount
1	15-010 - PLUMBING	Incorporate PR 27 as issued by Harriman. Ref Oliver Mechanical COP dated Feb 15, 2019.	Subcontract	\$ 11,448.00
2	16-100 - ELECTRICAL	No Cost change per Liberty Email dated 2/22/10.	Subcontract	\$ 0.00
Subtotal:				\$11,448.00
Perf. & Pay Bond (0.8%): 0.80% Applies to all line item types.				\$ 91.58
General Liability (0.895%): ~ 0.7% Applies to all line item types.				\$ 80.20
Fee (3.6%): 3.50% Applies to all line item types.				\$ 406.89
Grand Total:				\$12,026.47

Daniel Blisson (Harriman)
 1 Perimeter Road
 Manchester, New Hampshire 3103

City of Dover
 288 Central Ave
 Dover, New Hampshire 3820

Harvey Construction
 10 Harvey Road
 Bedford, New Hampshire 03110

SIGNATURE

DATE

SIGNATURE

DATE

SIGNATURE

DATE

Harvey Construction



**OLIVER
MECHANICAL
INC**

CHANGE ORDER PROPOSAL

Project Name:	Garrison School	Date:	February 15 th , 2019
General Contractor:	Harvey	CO Request #:	PR-027
Engineer	Harriman	Submitted By:	Michael Harrison

Description:	Reason:
Additional Balancing 12.20.19, 1.15.19 & Startup \$1,620.00 OMI balancing support on 12.20 & 1.4.19 & future startup - 16 hours @\$75/hr Pump Replacement – 16 hours @ \$75/hr Materials: Pump, VFD, misc materials - \$4,047.00 Additional Control Wiring – Seimens - \$2340.00 Wiring for pump & VFD are by others	Existing pump was found to be inadequate to meet flow requirements of the new boiler by Harriman per PR-027

Cost:	
Additional Mat. & Subs:	\$8,007.00
Additional Labor: \$75/Hr	\$2,400.00
Profit & Overhead: %10	\$1,041.00
Total CCO Request:	\$11,448.00

Attachments:
Pump & VFD submittal
PR-027
Pump Quote
Seimens CCO request 2.21

TERMS OF PAYMENT:

All material is guaranteed to be as approved. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs will be executed upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accidents, or delays beyond our control. Owner to carry fire and other necessary insurance. Our workers are fully covered by Workman's Compensation Insurance.

ACCEPTANCE OF CHANGE ORDER PROPOSAL:

The above prices, specifications, and conditions are satisfactory and hereby accepted. You are authorized to do the work as specified. Payment will be made as outlined above.

Signature:

Authorized Name:

Date:

Oliver Mechanical, Inc.

991 Candia Road, Manchester NH 03109 | 603 621 9063 | www.olivermechanicalinc.com



AUBURN
PORTLAND
PORTSMOUTH
BOSTON

207.784.5100
www.harriman.com

PROPOSAL REQUEST

PROJECT:

Dover School District, Garrison
Elementary School Facilities Study

NO.

~~027~~
027R1

OWNER:

SAU 11

DATE OF ISSUANCE:

~~February 7, 2019~~
February 18, 2019

TO CONTRACTOR:

Harvey Construction
Adam Reynolds

FROM ARCHITECT:

Harriman
46 Harriman Drive
Auburn, ME 04210

A/E PROJECT NO:
15618

Please submit an itemized proposal for changes in the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein.

This is not a Change Order, a Construction Change Directive, or a direction to proceed with the work described in the proposed modifications.

Description:

Provide new pump, variable frequency drive, and sequence in accordance with SKC57. Electrical requirements will be forthcoming.

Attachments:

SKC57
SKC57R1 (Updated with Electrical Info)

ISSUED BY:

Harriman
Jeff Cormier
Designer

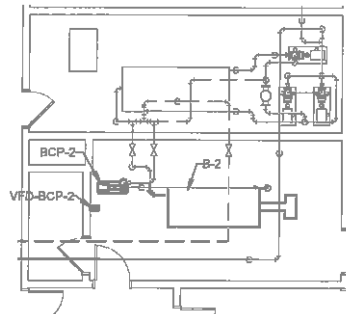
PUMP															
TAG	MANUFACTURER	MODEL	SERVICE	FLOW (GPM)	HEAD (FT.WG)	IMP DIA. (IN)	MAX IMP DIA (IN)	SUCTION (IN)	DISCHARGE (IN)	SPEED (RPM)	ELECTRIC			MOTOR CONTROL	NOTES
											HP	PHASE	VOLTS		
BCP-2	BELL AND GOSSETT	E-1610 3AD	BOILER 2	200	30	6	7	4"	3"	1800	3	3	208	VFD	1

NOTES:
1) PROVIDE SHAFT GROUNDING RING

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- THE VFD SHALL VARY THE PUMP SPEED AS REQUIRED TO PROVIDE SOFT STARTING.
- UPON RECEIVING AN ENABLE SIGNAL FROM THE BUILDING CONTROLS, THE PUMP SHALL SLOWLY RAMP TO THE DESIRED SPEED.
- THE DESIRED SPEED SHALL BE COORDINATED WITH THE TAB AGENT TO ACHIEVE THE DESIGN WATER FLOW.
- VFD ACCEPTABLE MANUFACTURERS:
 - SCHNEIDER ELECTRIC (S-FLEX)
 - ABB (ACH550 SERIES)
 - CERUS INDUSTRIAL, INC. (P-SERIES)
 - DANFOSS (VLT FC-100 SERIES)
 - ROCKWELL AUTOMATION (ALLEN-BRADLEY)
 - TOSHIBA (Q7 SERIES)
 - YASKAWA (E7 SERIES)

ELECTRICAL CONNECTION NOTE:
1. SERVE NEW PUMP (BCP-2) FROM EXISTING 20A/3P CIRCUIT BREAKER IN PANELBOARD DP-2 (CIRCUIT NUMBER 19) WITH 3#12&G-3/4"C. EXISTING PUMP LABELED P-3 - VERIFY).
WIRE VIA VFD.





Auburn, ME
207.784.5100
Portland, ME
207.775.0053
Portsmouth, NH
603.626.3242
Boston, MA
617.426.5050

DOVER SCHOOL DISTRICT
GARRISON ELEMENTARY
SCHOOL RENOVATIONS &
ADDITIONS - PHASE I

DOVER, NEW HAMPSHIRE	
HA Project No.	15618

Date	02-07-19
Scale	1/8" = 1'-0"
	
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BOILER PUMP REVISIONS

SKC57

PUMP

TAG	MANUFACTURER	MODEL	SERVICE	FLOW (GPM)	HEAD (FT.WG)	IMP DIA. (IN)	MAX IMP DIA (IN)	SUCTION (IN)	DISCHARGE (IN)	SPEED (RPM)	ELECTRIC			MOTOR CONTROL	NOTES
											HP	PHASE	VOLTS		
BCP-2	BELL AND GOSSETT	E-1510 3AD	BOILER 2	200	30	6	7	4"	3"	1800	3	3	208	VFD	1

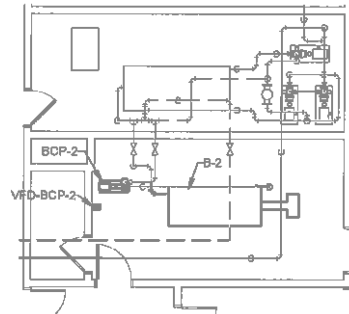
NOTES:

- 1) PROVIDE SHAFT GROUNDING RING

1. THE VFD SHALL VARY THE PUMP SPEED AS REQUIRED TO PROVIDE SOFT STARTING.
2. UPON RECEIVING AN ENABLE SIGNAL FROM THE BUILDING CONTROLS, THE PUMP SHALL SLOWLY RAMP TO THE DESIRED SPEED.
3. THE DESIRED SPEED SHALL BE COORDINATED WITH THE TAB AGENT TO ACHIEVE THE DESIGN WATER FLOW.
4. VFD ACCEPTABLE MANUFACTURERS:
 - a. SCHNEIDER ELECTRIC (S-FLEX)
 - b. ABB (ACH550 SERIES)
 - c. CERUS INDUSTRIAL, INC. (P-SERIES)
 - d. DANFOSS (VLT FC-100 SERIES)
 - e. ROCKWELL AUTOMATION (ALLEN-BRADLEY)
 - f. TOSHIBA (Q7 SERIES)
 - g. YASKAWA (E7 SERIES)

ELECTRICAL CONNECTION NOTE:

1. SERVE NEW PUMP (BCP-2) FROM EXISTING 20A/3P CIRCUIT BREAKER IN PANELBOARD DP-2 (CIRCUIT NUMBER 18) WITH 3#12&G-3/4". EXISTING PUMP LABELED P-3 - VERIFY.
WIRE VIA VFD.



Auburn, ME
207.784.5100
Portland, ME
207.775.0053
Portsmouth, NH
603.626.1242
Boston, MA
617.435.5050

DOVER SCHOOL DISTRICT GARRISON ELEMENTARY SCHOOL RENOVATIONS & ADDITIONS - PHASE I

DOVER, NEW HAMPSHIRE

HA Project No. 15618

Date	02-15-19
Scale	1/8" = 1'-0"
© 2019 Harriman Associates	

BOILER PUMP REVISIONS

SKC57



Change Order Proposal

- Oliver Mechanical INC
- 991 Candia Road
- Manchester NH
- Attn: Michael Harrison

Date: 2/21/19

Project: Garrison School Renovations

Proposal: Additional electrical and automation work required to automate new drive and pump.

Exclusions: All work to be performed during normal business hours.

Value: \$2,339.64

☒ **Wiring by Siemens** ☐ **Wiring by others** ☐ **No wiring required**

The Terms and Conditions of Sale shown on the attached are a part hereof

Terms of Payment:

☒ Monthly Progress Payments
☐ No Retainage
☐ _____ % in Advance
☐ Net 30 days

Proposal Accepted:
Siemens is
Authorized to proceed with the above work.

Proposal Submitted:

Purchaser	<u>Oliver Mechanical INC</u>	Seller	<u>Siemens Industries</u>
By	<u></u>	By	<u>Dusty Libby</u>
Title	<u></u>	Title	<u>Project Manager</u>
Date	<u></u>	Date	<u>2/21/19</u>

This proposal is valid until _____
Page 1 Of 2

Unrestricted



FIA FLUID INDUSTRIAL ASSOCIATES, INC.

INC.

Quotation No. A-101246

FIA Inc.
FIA Inc.
Woburn, MA 01888
Phone: (781) 938-8900
Fax: (781) 933-3965

Quote Date: 2/11/2019
Quoted By: Kim Garrant
Date: 2/14/2019 10:17:16 AM
Terms and Conditions of Sale
Freight: **Full Freight Allowed**
Job: **Dover School - Garrison
Elementary
Dover, NH 03820**
Engineer: **HARRIMAN**

TO: **Oliver Mechanical**
ATTN: **Mike Harrison**

We are pleased to quote you on the following equipment for the above job subject to approval. Quantities listed are not guaranteed and should be verified. Prices will be adjusted accordingly. This quotation is subject to change without notice and void after 30 days unless otherwise stated below. All Contracts or Orders are subject to acceptance by the Company and are contingent upon non-occurrence of strikes or other delays beyond their control. In addition to prices named herein, you are to pay any applicable sales taxes.

Qty	Description & Tag	Wt (lbs)	Net Price Ea.	Total Net Price
CENTRIFUGAL PUMPS				
1	Tag: BCP-2 B&G Base Mounted Pump Series c-1510, Model 3 AD, SS, 3 HP, 1800 RPM, 182T Frame, with 6" Impeller, STD-Buna/Carbon/Ceramic/SS/Bronze Seal, Special Coupling (Rexnord Omega), Baldor, DPPE, Nema Premium Eff, Super-E w/Aegis sgr, Inverter Duty, 230/460/3/60 Motor, 200 GPM, 30 FT TDH	231	\$2,088.00	\$2,088.00
1	Pump Start-Up - Manufacturers Representative Pump Start-Up Including Check & Test of Rotation Lubrication & Laser Alignment for B&G Base Mounted Pumps. If a Certificate of Insurance (COI) is required for startup services an additional \$250 per named contractor will be added.	0	\$250.00 NET	\$250.00 NET
Total CENTRIFUGAL PUMPS				\$2,338.00
TECHNOLOGIC VFDS				
1	Tag: BCP-1 BG_P2001785 - B&G VFD, 3HP, 200-240V, 3PH, NEMA 1, IP21, DISC	30	\$959.00	\$959.00



FIA FLUID INDUSTRIAL ASSOCIATES, INC.

INC.

1	VFD Startup - VFD Startup If a Certificate of Insurance (COI) is required for startup services an additional \$250 per named contractor will be added.	0	\$250.00 NET	\$250.00 NET
	Total TECHNOLOGIC VFDS			\$1,209.00
Total		261		\$3,547.00

JOB: Dover School - Garrison Elementary

REPRESENTATIVE: FIA Inc.

UNIT TAG:
ENGINEER: HARRIMAN

CONTRACTOR: Oliver Mechanical

ORDER NO.
SUBMITTED BY: Kim Garrant

APPROVED BY:
DATE: 2/14/2019

DATE:
DATE:

Technologic® Intelligent Pump Controller



TECHNOLOGIC STANDARD FEATURES	
CONTROL METHOD	Constant Pressure, Linear Control Curve, Quadratic Control Curve, Factory configured for sensorless operation (optional). Field configurable for use with a wired transducer.
CONTROL ZONES	Up to 4 zones.
STARTUP GENIE	Quick start for programming hydraulic specific applications and pump protections.
MULTIPUMP	Up to 4 pumps via RS485.
ENCLOSURE	UL Type ☒ 1 ☐ 12 ☐ 3R ☐ 4X (Bypass has type 1 and 12 only)
POWER DISCONNECT SWITCH	☒ Standard Disconnect ☐ Fused Disconnect Switch (Fused Disconnect Switch is standard for Drive-Bypass and 150-600HP Drive)
EMI/RFI CONTROL	Integrated filter to meet EN62800-3.
HARMONIC SUPPRESSION	Integrated non-saturating dual DC link reactors provide better harmonic performance than a 5% AC line reactor.
COOLING	Fan-cooled through temperature controlled and easy replacement.
AMBIENT TEMPERATURE RATING	14°F to 113°F (-10°C to 45° C)
COMMUNICATION PROTOCOLS	BACnet, Modbus RTU, N2 Metasys as standard
ANALOG INPUTS	1 configurable for either voltage (0 to 10VDC) or current (0/4 to 20mA) and 1 current (0/4 to 20mA).
ANALOG OUTPUTS	1 (0/4 to 20mA) up to 500 ohm load accurate to 1% of full scale
DIGITAL INPUTS	4 (0 to 24VDC), NPN or PNP, 0 to 24VDC, on 5 msec scan Interval, Up to 2 can be configured as pulse inputs.
DIGITAL OUTPUTS	2 (0 to 24VDC), 40mA max current, configurable as pulse outputs.
RELAY OUTPUTS	2 programmable, 240VAC or 400VAC up to 2 A
BYPASS OPTION	☒ None ☐ Drive-Bypass, 3 Contactor, 100 KA SCCR, Electronic Control, Fused Disconnect Switch

200 - 240VAC 1 Phase Mains Drive			
HP	Output Current	TYPE 1 Frame	TYPE 12/3R/4X Frame
1.5	6.8	A5	A5
2	7.5	B1	B1
3	10.6	B1	B1
5	16.7	B1	B1
7.5	24.2	B1	B1
10	30.8	B2	B2
20	59.4	C1	C1
30	88	C2	C2

200 - 240 VAC 3 Phase Mains Drive 208 / 230 VAC 3 Phase Mains Drive-Bypass								
HP	Output Current (A)		IP20 Frame	TYPE 1 Frame		TYPE 12 Frame		TYPE 3R/4X Frame
	Drive 200-240 VAC	Drive-Bypass 208/230 VAC	Drive 200/240 VAC	Drive 200-240 VAC	Drive-Bypass 208/230 VAC	Drive 200-240 VAC	Drive-Bypass 208/230 VAC	Drive 200-240 VAC
0.5	N/A	2.4/2.2	N/A	N/A	A2	N/A	A5	N/A
0.75	N/A	3.5/3.2	N/A	N/A	A2	N/A	A5	N/A
1	N/A	4.6/4.2	N/A	N/A	A2	N/A	A5	N/A
1.5	6.8	6.8/6	A2	A2	A2	A5	A5	A5
2	7.5	7.5/6.8	A2	A2	A2	A5	A5	A5
3	10.6	10.6/9.6	A2	A2	A2	A5	A5	A5
5	16.7	16.7/15.2	A3	A3	A3	A5	A5	A5
7.5	24.2	24.2/22	B3	B1	B3	B1	B1	B1
10	30.8	30.8/28	B3	B1	B3	B1	B1	B1
15	46.2	46.2/42	B3	B1	B3	B1	B2	B1
20	59.4	59.4/54.0	B4	B2	B4	B2	B2	B2
25	74.8	74.8/68	B4	C1	C3/B4	C1	C1	C1
30	88	88/80	C3	C1	C3	C1	C1	C1
40	115	114/104	C3	C1	C3	C1	C2	C1
50	143	143/130	C4	C2	C4	C2	C2	C2
60	170	169/154	C4	C2	C4	C2	C2	C2

ENGINEERING
TOMORROW

Danfoss

Selection Guide | VLT® HVAC Drive FC 102 | 1.1 – 400 kW

Drive down operating costs,
with the leader in **HVAC efficiency**

98%

Energy efficiency
Save energy and
money with HVAC
optimized drives

VLT®
HVAC Drive

drives.danfoss.com

VLT



Dedicated pump features

The VLT® HVAC Drive is developed in close cooperation with OEMs, contractors, and manufacturers around the world. Each drive contains a wide range of built-in, dedicated features which save energy in pump applications.

Embedded pump controller

The Pump Cascade Controller distributes operation hours evenly across all pumps. Wear and tear on individual pumps is therefore reduced to a minimum, extending their lifetime expectancy and reliability considerably.

Vital water supply

If a pipe leaks or breaks, the VLT® HVAC Drive can reduce the motor speed to prevent overload, while continuing to supply water at a lower speed.

Sleep mode

In situations with low or now flow, the drive enters sleep mode to conserve energy. When the pressure falls below the pre-defined setpoint, the drive starts automatically. Compared to continuous operation this method reduces energy costs and equipment wear and tear, extending the lifetime of the application.

1. Dry Pump Protection and End of Curve

If the pump runs without creating the desired pressure, the drive sets off an alarm or performs another pre-programmed action. This happens for example when a well runs dry or a pipe leaks.

2. Auto tuning of PI controllers

Auto tuning enables the drive to monitor how the system reacts to corrections made by the drive constantly. The drive learns from it and calculates the P and I values, so precise and stable operation is restored quickly.

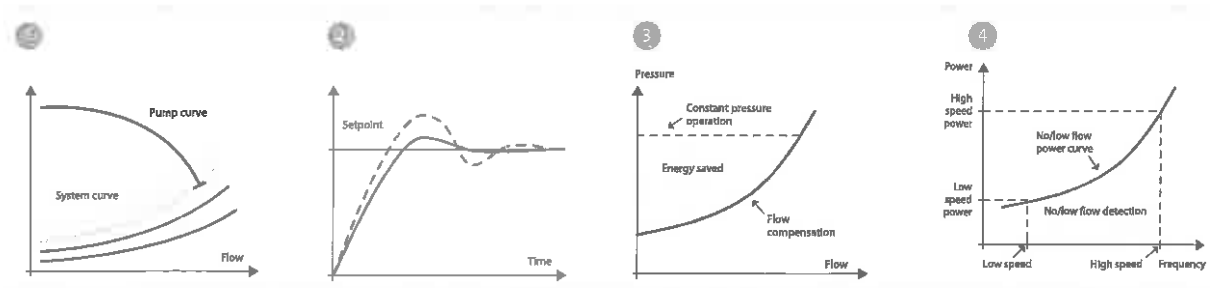
3. Flow compensation

A pressure sensor mounted close to the fan or pump provides a reference point that enables pressure to be kept constant at

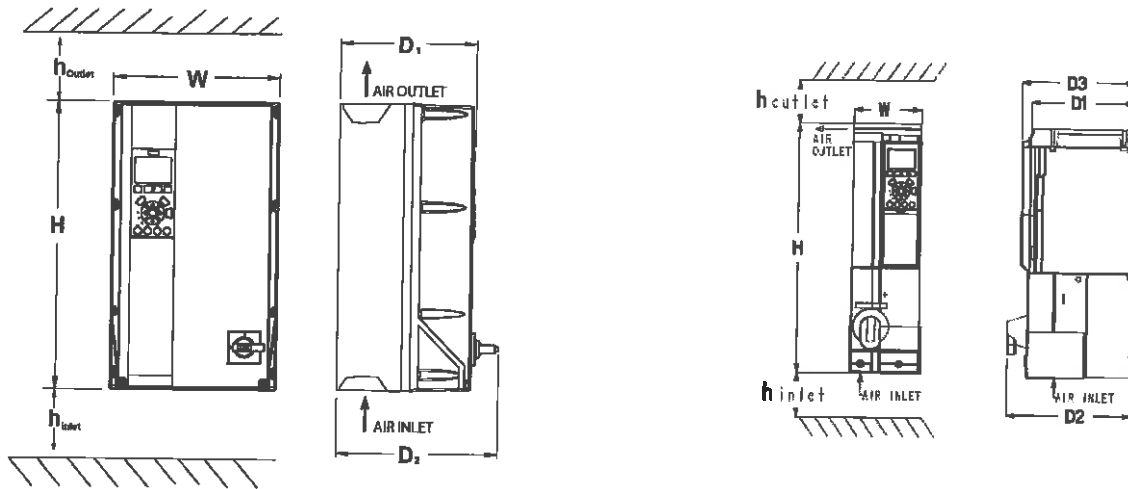
the discharge end of the system. The drive constantly adjusts the pressure reference to follow the system curve. This method both saves energy and reduces installation costs.

4. No/low flow

During operation, a pump normally consumes more power the faster it runs. In situations where the pump runs fast, but is not fully loaded, and does not consume adequate power, the drive compensates accordingly. This is a particular advantage when water circulation stops, the pump runs dry or when pipes leak.



Drive Drawings and Specification Table



Frame Size	Nominal Weight lbs/Kg	Enclosure Rating		Dimensions						
		TYPE 1	TYPE 12	H inches/mm	W inches/mm	D1 inches/mm (without option A/B)	D2 inches/mm	D3 inches/mm (without option A/B)	h Inlet inches/mm	h outlet inches/mm
A2 ¹	10.8/4.9	X		19.1/485	5.2/132	8.3/210	9.6/245	8.7/222	3.9/100	3.9/100
A3 ¹	14.6/6.6	X		19.1/485	5.2/132	8.3/210	9.6/245	8.7/222	3.9/100	3.9/100
A5	31.3/14.2		X	18.5/420	9.5/242	7.9/200	9.4/238	7.9/200	3.9/100	3.9/100
B1	51/23	X	X	18.9/480	9.5/242	10.2/260	12/304	10.2/260	3.9/100	3.9/100
B2	60/27	X	X	25.6/650	9.5/242	10.2/260	12/304	10.2/260	3.9/100	3.9/100
C1	99/45	X	X	26.9/680	12.1/308	12.2/310	14.1/358	12.2/310	7.9/200	7.9/200
C2	143/65	X	X	30.2/770	14.6/370	13/335	14.9/393	13/335	8.9/225	8.9/225

Note:

D1 and D3 are the same if the option A/B card does not require a new LCP frame.

Frame Size	Nominal Weight lbs/Kg	Enclosure Rating		Dimensions						
		TYPE 1	TYPE 12	H inches/mm	W inches/mm	D1 inches/mm	D2 inches/mm	h Inlet inches/mm	h outlet inches/mm	
D1	229.3/104	X	X	47.6/1209	16.54/420	14.96/380	16.4/417	8.9/225	8.9/225	
D2	332.9/151	X	X	62.56/1589	16.54/420	14.96/380	16.4/417	8.9/225	8.9/225	
D3	200.62/91	X	X	41.18/1046	16.06/408	14.78/375	16.4/417	8.9/225	8.9/225	
D4	304.24/138	X	X	52.24/1327	16.06/408	14.78/375	16.4/417	8.9/225	8.9/225	
D5	255/116	X	X	52.13/1324	12.8/325	15/381	16.3/416	8.9/225	8.9/225	
D7	440/200	X	X	77.87/1978	16.54/420	15.2/386	16.5/418	8.9/225	8.9/225	

Specifications

8.4 Ambient Conditions

Environment

IP rating	IP00/Chassis, IP20 ¹⁾ /Chassis, IP21 ²⁾ /Type 1, IP54/Type 12, IP55/Type 12, Type 3R, IP66/Type 4X
Vibration test	1.0 g
Max. relative humidity	5% - 93% (IEC 721-3-3; Class 3K3 (non-condensing) during operation
Aggressive environment (IEC 60068-2-43) H ₂ S test	class Kd
Ambient temperature ³⁾	Max. 50 °C (24-hour average maximum 45 °C)
Minimum ambient temperature during full-scale operation	0 °C
Minimum ambient temperature at reduced performance	- 10 °C
Temperature during storage/transport	-25 to +65/70 °C
Maximum altitude above sea level without derating	1000 m

Derating for high altitude, see special conditions in the Design Guide

EMC standards, Emission	EN 61800-3
EMC standards, Immunity	EN 61800-3
Energy efficiency class ⁴⁾	IE2

See section on special conditions in the Design Guide.

1) Only for ≤ 3.7 kW (200-240 V), ≤ 7.5 kW (400-480 V)

2) As enclosure kit for ≤ 3.7 kW (200-240 V), ≤ 7.5 kW (400-480 V)

3) Derating for high ambient temperature, see special conditions in the Design Guide

4) Determined according to EN50598-2 at:

- Rated load
- 90% rated frequency
- Switching frequency factory setting
- Switching pattern factory setting

8.5 Cable Specifications

Cable lengths and cross-sections for control cables¹⁾

Max. motor cable length, screened	150 m (492 ft)
Max. motor cable length, unscreened	300 m (984 ft)
Maximum cross-section to control terminals, flexible/ rigid wire without cable end sleeves	1.5 mm ² /16 AWG
Maximum cross-section to control terminals, flexible wire with cable end sleeves	1 mm ² /18 AWG
Maximum cross-section to control terminals, flexible wire with cable end sleeves with collar	0.5 mm ² /20 AWG
Minimum cross-section to control terminals	0.25 mm ² /24AWG

¹⁾ For power cables, see electrical data tables in chapter 8.1 Electrical Data.

8.6 Control Input/Output and Control Data

Digital inputs

Programmable digital inputs	4 (6) ¹⁾
Terminal number	18, 19, 27 ¹⁾ , 29 ¹⁾ , 32, 33,
Logic	PNP or NPN
Voltage level	0-24 V DC
Voltage level, logic 0 PNP	<5 V DC
Voltage level, logic 1 PNP	>10 V DC
Voltage level, logic 0 NPN ²⁾	>19 V DC
Voltage level, logic 1 NPN ²⁾	<14 V DC
Maximum voltage on input	28 V DC
Pulse frequency range	0-110 kHz

Specifications

(Duty cycle) Min. pulse width	4.5 ms
Input resistance, R_i	approx. 4 k Ω
Safe Torque Off (STO) Terminal 37 ^{3), 4)} (Terminal 37 is fixed PNP logic)	
Voltage level	0–24 V DC
Voltage level, logic 0 PNP	<4 V DC
Voltage level, logic 1 PNP	>20 V DC
Maximum voltage on input	28 V DC
Typical input current at 24 V	50 mA _{rms}
Typical input current at 20 V	60 mA _{rms}
Input capacitance	400 nF

All digital inputs are galvanically isolated from the supply voltage (PELV) and other high-voltage terminals.

¹⁾ Terminals 27 and 29 can also be programmed as output.

²⁾ Except Safe Torque Off input terminal 37.

³⁾ See VLT[®] adjustable frequency drives – Safe Torque Off Operating Instructions for further information about terminal 37 and Safe Torque Off.

⁴⁾ When using a contactor with a DC coil in combination with STO, always make a return path for the current from the coil when turning it off. The return path can be made by using a freewheel diode (or, alternatively, a 30 V or 50 V MOV for quicker response time) across the coil. Typical contactors can be bought with this diode.

Analog inputs	
Number of analog inputs	2
Terminal number	53, 54
Modes	Voltage or current
Mode select	Switch S201 and switch S202
Voltage mode	Switch S201/switch S202 = OFF (U)
Voltage level	–10 V to +10 V (scalable)
Input resistance, R_i	approx. 10 k Ω
Max. voltage	±20 V
Current mode	Switch S201/switch S202 = ON (I)
Current level	0/4 to 20 mA (scalable)
Input resistance, R_i	approx. 200 Ω
Max. current	30 mA
Resolution for analog inputs	10 bit (+ sign)
Accuracy of analog inputs	Max. error 0.5% of full scale
Bandwidth	20 Hz/100 Hz

The analog inputs are galvanically isolated from the supply voltage (PELV) and other high-voltage terminals.

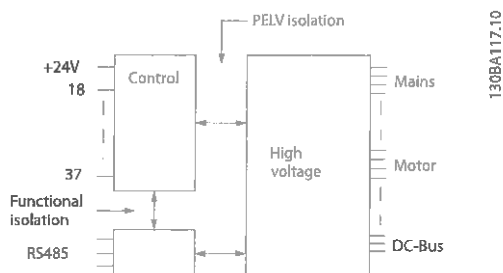


Figure 8.1 PELV Isolation

Specifications

Pulse

Programmable pulse	2/1
Terminal number pulse	29 ¹⁾ , 32 ²⁾ /33
Max. frequency at terminal 29, 33	110 kHz (Push-pull driven)
Max. frequency at terminal 29, 33	5 kHz (open collector)
Min. frequency at terminal 29, 33	4 Hz
Voltage level	see chapter 8.6.1 Digital Inputs
Maximum voltage on input	28 V DC
Input resistance, R_i	approx. 4 k Ω
Pulse input accuracy (0.1-1 kHz)	Max. error: 0.1% of full scale
Encoder input accuracy (1-11 kHz)	Max. error: 0.05 % of full scale

The pulse and encoder inputs (terminals 29, 32, 33) are galvanically isolated from the supply voltage (PELV) and other high-voltage terminals.

1) only

2) Pulse inputs are 29 and 33

Analog output

Number of programmable analog outputs	1
Terminal number	42
Current range at analog output	0/4-20 mA
Max. load GND - analog output	500 Ω
Accuracy on analog output	Max. error: 0.5% of full scale
Resolution on analog output	12 bit

The analog output is galvanically isolated from the supply voltage (PELV) and other high-voltage terminals.

Control card, RS485 serial communication

Terminal number	68 (P, TX+, RX+), 69 (N, TX-, RX-)
Terminal number 61	Common for terminals 68 and 69

The RS485 serial communication circuit is functionally separated from other central circuits and galvanically isolated from the supply voltage (PELV).

Digital output

Programmable digital/pulse outputs	2
Terminal number	27, 29 ¹⁾
Voltage level at digital/frequency output	0-24 V
Maximum output current (sink or source)	40 mA
Maximum load at frequency output	1 k Ω
Maximum capacitive load at frequency output	10 nF
Minimum output frequency at frequency output	0 Hz
Maximum output frequency at frequency output	32 kHz
Accuracy of frequency output	Maximum error: 0.1% of full scale
Resolution of frequency outputs	12 bit

¹⁾ Terminals 27 and 29 can also be programmed as input.

The digital output is galvanically isolated from the supply voltage (PELV) and other high-voltage terminals.

Control card, 24 V DC output

Terminal number	12, 13
Output voltage	24 V +1, -3 V
Maximum load	200 mA

The 24 V DC supply is galvanically isolated from the supply voltage (PELV), but has the same potential as the analog and digital inputs and outputs.

Specifications

Relay outputs

Programmable relay outputs	2
Relay 01 Terminal number	1-3 (break), 1-2 (make)
Max. terminal load (AC-1) ¹⁾ on 1-3 (NC), 1-2 (NO) (Resistive load)	240 V AC, 2 A
Max. terminal load (AC-15) ¹⁾ (Inductive load @ cosφ 0.4)	240 V AC, 0.2 A
Max. terminal load (DC-1) ¹⁾ on 1-2 (NO), 1-3 (NC) (Resistive load)	60 V DC, 1 A
Max. terminal load (DC-13) ¹⁾ (Inductive load)	24 V DC, 0.1 A
Relay 02 (only) Terminal number	4-6 (break), 4-5 (make)
Max. terminal load (AC-1) ¹⁾ on 4-5 (NO) (Resistive load) ²⁾³⁾ Overvoltage cat. II	400 V AC, 2 A
Max. terminal load (AC-15) ¹⁾ on 4-5 (NO) (Inductive load @ cosφ 0.4)	240 V AC, 0.2 A
Max. terminal load (DC-1) ¹⁾ on 4-5 (NO) (Resistive load)	80 V DC, 2 A
Max. terminal load (DC-13) ¹⁾ on 4-5 (NO) (Inductive load)	24 V DC, 0.1 A
Max. terminal load (AC-1) ¹⁾ on 4-6 (NC) (Resistive load)	240 V AC, 2 A
Max. terminal load (AC-15) ¹⁾ on 4-6 (NC) (Inductive load @ cosφ 0.4)	240 V AC, 0.2 A
Max. terminal load (DC-1) ¹⁾ on 4-6 (NC) (Resistive load)	50 V DC, 2 A
Max. terminal load (DC-13) ¹⁾ on 4-6 (NC) (Inductive load)	24 V DC, 0.1 A
Min. terminal load on 1-3 (NC), 1-2 (NO), 4-6 (NC), 4-5 (NO)	24 V DC 10 mA, 24 V AC 20 mA
Environment according to EN 60664-1	Overvoltage category III/pollution degree 2

1) IEC 60947 part 4 and 5

The relay contacts are galvanically isolated from the rest of the circuit by reinforced isolation (PELV).

2) Overvoltage Category II

3) UL applications 300 V AC 2A

Control card, 10 V DC output

Terminal number	50
Output voltage	10.5 V ±0.5 V
Maximum load	15 mA

The 10 V DC supply is galvanically isolated from the supply voltage (PELV) and other high-voltage terminals.

Control characteristics

Resolution of output frequency at 0–590 Hz	± 0.003 Hz
Repeat accuracy of precise start/stop (terminals 18, 19)	± 0.1 ms
System response time (terminals 18, 19, 27, 29, 32, 33)	≤ 10 ms
Speed control range (open loop)	1:100 of synchronous speed
Speed control range (closed loop)	1:1000 of synchronous speed
Speed accuracy (open loop)	30–4,000 RPM: error ±8 RPM
Speed accuracy (closed loop), depending on resolution of feedback device	0–6,000 RPM: error ±0.15 RPM

All control characteristics are based on a 4-pole asynchronous motor

Control card performance

Scan interval	5 ms
---------------	------

Control card, USB serial communication

USB standard	1.1 (full speed)
USB plug	USB type B device plug

Connection to PC is carried out via a standard host/device USB cable.

The USB connection is galvanically isolated from the supply voltage (PELV) and other high-voltage terminals.

The USB ground connection is NOT galvanically isolated from protective earth. Use only an isolated laptop as PC connection to the USB connector on the adjustable frequency drive.

Electrical Installation

4.4 Wiring Schematic

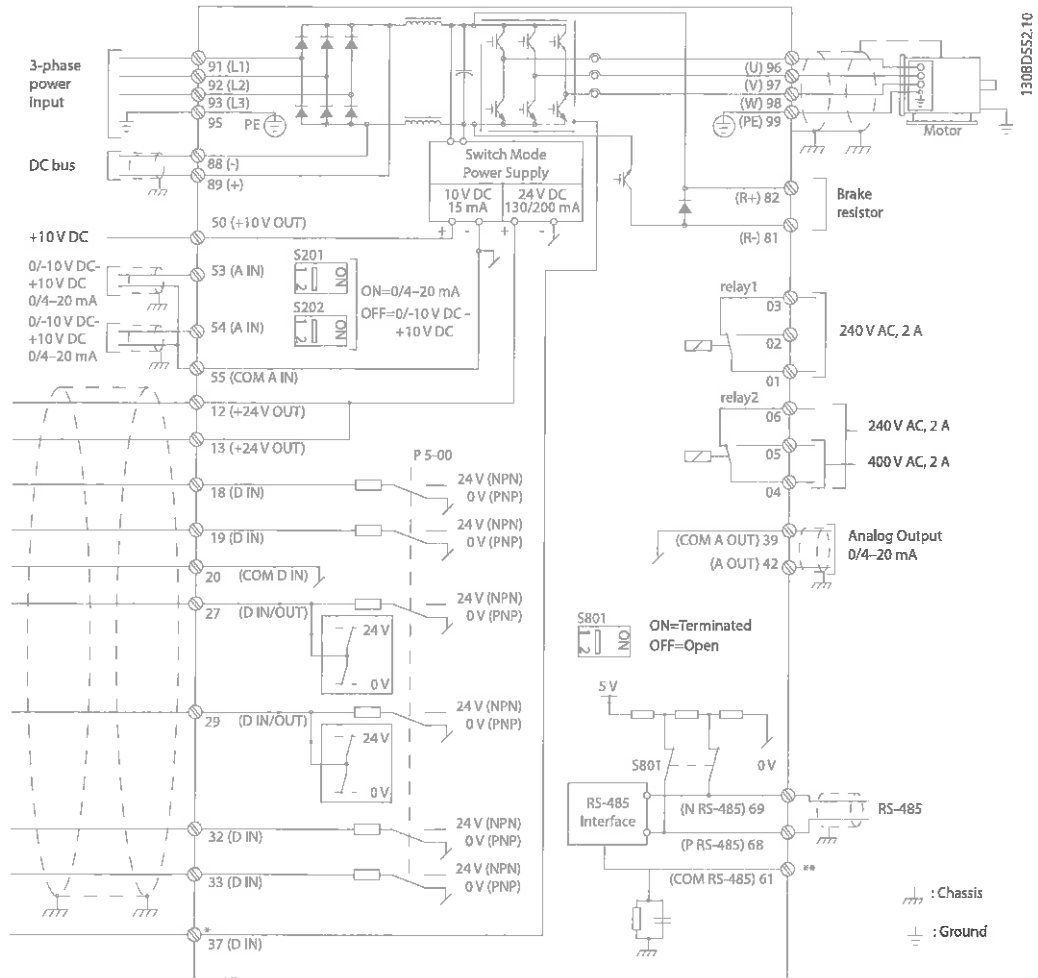


Figure 4.1 Basic Wiring Schematic

A=Analog, D=Digital

*Terminal 37 (optional) is used for Safe Torque Off.

**Do not connect cable screen.

Electrical Installation

4.8.1 Control Terminal Types

Figure 4.14 and Figure 4.15 show the removable adjustable frequency drive connectors. Terminal functions and default settings are summarised in Table 4.2.

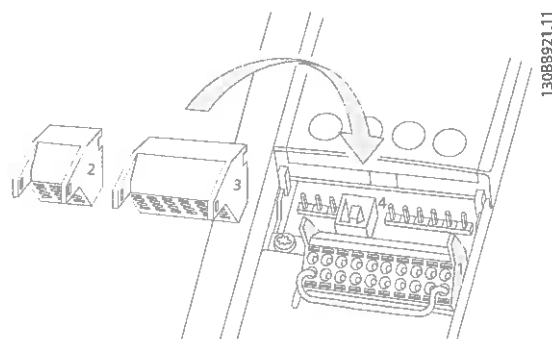


Figure 4.14 Control Terminal Locations

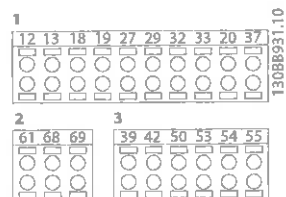


Figure 4.15 Terminal Numbers

- **Connector 1 provides:**
 - 4 programmable digital inputs terminals.
 - 2 additional digital terminals programmable as either input or output.
 - 24 V DC terminal supply voltage.
 - Optional customer supplied 24 V DC voltage.
- **Connector 2 terminals (+)68 and (-)69 are for an RS-485 serial communication connection.**
- **Connector 3 provides:**
 - 2 analog inputs.
 - 1 analog output.
 - 10 V DC supply voltage.
 - Commons for the inputs and output.
- **Connector 4 is a USB port available for use with the MCT 10 Set-up Software.**

Terminal description			
Terminal	Parameter	Default setting	Description
Digital Inputs/Outputs			
12, 13	-	+24 V DC	24 V DC supply voltage for digital inputs and external transducers. Maximum output current 200 mA for all 24 V loads.
18	5-10	[8] Start	Digital Inputs.
19	5-11	[0] No operation	
32	5-14	[0] No operation	
33	5-15	[0] No operation	
27	5-12	[2] Coast inverse	For digital input or output. Default setting is input.
29	5-13	[14] JOG	
20	-		Common for digital inputs and 0 V potential for 24 V supply.
37	-	Safe Torque Off (STO)	Safe Input (optional). Used for STO.
Analog Inputs/Outputs			
39	-		Common for analog output
42	6-50	Speed 0 - High Limit	Programmable analog output. 0-20 mA or 4-20 mA at a maximum of 500 Ω
50	-	+10 V DC	10 V DC analog supply voltage for potentiometer or thermistor. 15 mA maximum
53	6-1	Reference	Analog input. For voltage or current. Switches A53 and A54 select mA or V.
54	6-2	Feedback	
55	-		Common for analog input
Serial Communication			
61	-		Integrated RC-Filter for cable screen. ONLY for connecting the screen in the event of EMC problems.

Electrical Installation

Terminal description			
Terminal	Parameter	Default setting	Description
68 (+)	8-3		RS-485 Interface. A control card switch is provided for termination resistance.
69 (-)	8-3		
Relays			
01, 02, 03	5-40 [0]	[9] Alarm	Form C relay output.
04, 05, 06	5-40 [1]	[5] Running	For AC or DC voltage and resistive or inductive loads.

Table 4.2 Terminal Description

Additional terminals:

- 2 form C relay outputs. Location of the outputs depends on adjustable frequency drive configuration.
- Terminals located on built-in optional equipment. See the manual provided with the equipment option.

4.8.2 Wiring to Control Terminals

Control terminal connectors can be unplugged from the adjustable frequency drive for ease of installation, as shown in Figure 4.16.

NOTICE!

Keep control wires as short as possible and separate from high power cables to minimise interference.

1. Open the contact by inserting a small screwdriver into the slot above the contact and push the screwdriver slightly upwards.

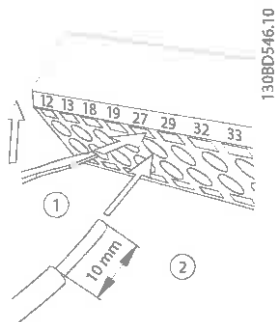


Figure 4.16 Connecting Control Wires

2. Insert the bare control wire into the contact.
3. Remove the screwdriver to fasten the control wire into the contact.
4. Ensure that the contact is firmly established and not loose. Loose control wiring can be the source of equipment faults or less than optimal operation.

See chapter 8.5 *Cable Specifications* for control terminal wiring sizes and chapter 6 *Application Set-up Examples* for typical control wiring connections.

4.8.3 Enabling Motor Operation (Terminal 27)

A jumper wire is required between terminal 12 (or 13) and terminal 27 for the adjustable frequency drive to operate when using factory default programming values.

- Digital input terminal 27 is designed to receive 24 V DC external interlock command.
- When no interlock device is used, wire a jumper between control terminal 12 (recommended) or 13 to terminal 27. The jumper provides an internal 24 V signal on terminal 27.
- When the status line at the bottom of the LCP reads *AUTO REMOTE COAST*, it indicates that the unit is ready to operate but is missing an input signal on terminal 27.
- When factory installed optional equipment is wired to terminal 27, do not remove that wiring.

NOTICE!

The adjustable frequency drive cannot operate without a signal on terminal 27, unless terminal 27 is reprogrammed.

4.8.4 Voltage/Current Input Selection (Switches)

The analog input terminals 53 and 54 allow setting of input signal to voltage (0-10 V) or current (0/4-20 mA).

Default parameter setting:

- Terminal 53: Speed reference signal in open loop (see 16-61 *Terminal 53 Switch Setting*).
- Terminal 54: Feedback signal in closed loop (see 16-63 *Terminal 54 Switch Setting*).

NOTICE!

Disconnect power to the adjustable frequency drive before changing switch positions.

5.3 Local Control Panel Operation

5.3.1 Local Control Panel

The local control panel (LCP) is the combined display and keypad on the front of the unit.

The LCP has several user functions:

- Start, stop, and control speed when in local control.
- Display operational data, status, warnings and cautions.
- Program adjustable frequency drive functions.
- Manually reset the adjustable frequency drive after a fault when auto-reset is inactive.

An optional numeric LCP (NLCP) is also available. The NLCP operates in a manner similar to the LCP. See the product relevant *programming guide* for details on use of the NLCP.

NOTICE

For commissioning via PC, install the MCT 10 Set-up Software. The software is available for download (basic version) or for ordering (advanced version, order number 130B1000). For more information and downloads, see www.danfoss.com/BusinessAreas/DrivesSolutions/Software+MCT10/MCT10+Downloads.htm.

5.3.2 LCP Layout

The LCP is divided into 4 functional groups (see Figure 5.1).

- A. Display area
- B. Display menu keys
- C. Navigation keys and indicator lights (LEDs)
- D. Operation keys and reset

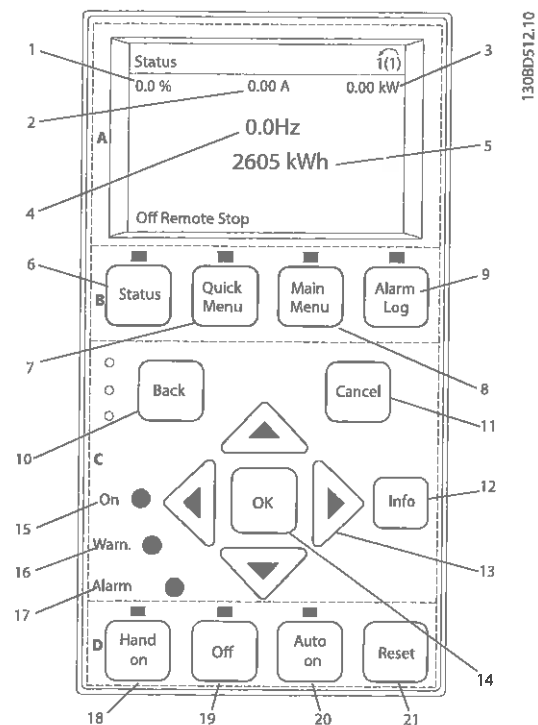


Figure 5.1 Local Control Panel (LCP)

A. Display Area

The display area is activated when the adjustable frequency drive receives power from mains voltage, a DC bus terminal, or an external 24 V DC supply.

The information displayed on the LCP can be customised for user application. Select options in the Quick Menu Q3-13 *Display Settings*.

Callout	Display	Parameter number	Default setting
1	1.1	0-20	Reference %
2	1.2	0-21	Motor current
3	1.3	0-22	Power [kW]
4	2	0-23	Frequency
5	3	0-24	kWh counter

Table 5.1 Legend to Figure 5.1, Display Area

Commissioning

B. Display Menu Keys

Menu keys are used for menu access for parameter set-up, toggling through status display modes during normal operation, and viewing fault log data.

Callout	Key	Function
6	Status	Shows operational information.
7	Quick Menu	Allows access to programming parameters for initial set-up instructions and many detailed application instructions.
8	Main Menu	Allows access to all programming parameters.
9	Alarm Log	Displays a list of current warnings, the last 10 alarms, and the maintenance log.

Table 5.2 Legend to Figure 5.1, Display Menu Keys

C. Navigation Keys and Indicator Lights (LEDs)

Navigation keys are used for programming functions and moving the display cursor. The navigation keys also provide speed control in local (hand) operation. There are also 3 adjustable frequency drive status indicator lights in this area.

Callout	Key	Function
10	Back	Reverts to the previous step or list in the menu structure.
11	Cancel	Cancels the last change or command as long as the display mode has not changed.
12	Info	Press for a definition of the function being displayed.
13	Navigation keys	Press to move between items in the menu.
14	OK	Press to access parameter groups or to enable a choice.

Table 5.3 Legend to Figure 5.1, Navigation Keys

Callout	Indicator	Light	Function
15	ON	Green	The ON light activates when the adjustable frequency drive receives power from mains voltage, a DC bus terminal, or an external 24 V supply.
16	WARN	Yellow	When a warning is issued, the yellow WARN light comes on and text appears in the display area identifying the problem.
17	ALARM	Red	A fault condition causes the red alarm light to flash and an alarm text is displayed.

Table 5.4 Legend to Figure 5.1, Indicator Lights (LEDs)

D. Operation Keys and Reset

Operation keys are located at the bottom of the LCP.

Callout	Key	Function
18	Hand On	Starts the adjustable frequency drive in local control. An external stop signal by control input or serial communication overrides the local hand on.
19	Off	Stops the motor but does not remove power to the adjustable frequency drive.
20	Auto On	Puts the system in remote operational mode. Responds to an external start command by control terminals or serial communication.
21	Reset	Resets the adjustable frequency drive manually after a fault has been cleared.

Table 5.5 Legend to Figure 5.1, Operation Keys and Reset

NOTICE!

The display contrast can be adjusted by pressing [Status] and [▲]/[▼] keys.

5.3.3 Parameter Settings

Establishing the correct programming for applications often requires setting functions in several related parameters.

Programming data are stored internally in the adjustable frequency drive.

- For backup, upload data into the LCP memory
- To download data to another adjustable frequency drive, connect the LCP to that unit and download the stored settings
- Restoring factory default settings does not change data stored in the LCP memory

5.3.4 Uploading/Downloading Data to/from the LCP

- Press [Off] to stop the motor before uploading or downloading data.
- Press [Main Menu] 0-50 LCP Copy and press [OK].
- Select [1] All to LCP to upload data to the LCP or select [2] All from LCP to download data from the LCP.
- Press [OK]. A progress bar shows the uploading or downloading progress.



Bell & Gossett
a xylem brand

SUBMITTAL
B-880.8D

JOB: Dover School - Garrison Elementary

REPRESENTATIVE: FIA Inc.

UNIT TAG: BCP-2

ENGINEER: HARRIMAN

CONTRACTOR: Oliver Mechanical

ORDER NO.

SUBMITTED BY: Kim Garrant

APPROVED BY:

DATE: 2/14/2019

DATE:

DATE:



Series e-1510 3AD Base Mounted End Suction Pump

DESCRIPTION:

The Series e-1510 is available in 28 sizes and a variety of configuration options that enable customization and flexibility to fit a broad range of operating conditions. Flows up to 4950 GPM heads to 534 feet.

SPECIFICATIONS

FLOW	200 (GPM)	HEAD	30 (FT)
HP	3	RPM	1800
VOLTS		230/460	
CYCLE	60	PHASE	3
ENCLOSURE	Baldor DPPE Nema Premium Eff. Super-E w/Aegis sgr Inverter Duty		
APPROX. WEIGHT	231		
SPECIALS	Special Coupling (Rexnord Omega)		

Note: Equipped with NEOPRENE coupling

MATERIALS OF CONSTRUCTION

☒ Stainless Steel Fitted

FEATURES

☒ ANSI/OSHA Coupling Guard

☒ Center Drop Out Spacer Coupling

☒ Fabricated Heavy Duty Baseplate

MAXIMUM WORKING PRESSURE

☒ 175 psi (12 bar) W.P.

w/ 125# ANSI flange drilling

PUMP VARIABLE SPEED CONTROL

☐ Integrated Technologic® Sensorless Control (ITSC)

☐ Integrated Technologic® (IT)

☐ External input by others

☐ Pressure Sensor(s)

☐ Differential Pressure Sensor(s)

☐ Flow Sensor(s) ☐ By Others

PARALLEL PUMPING SYSTEM

☐ Sensorless Control (ITSC)

☐ Sensored Control (IT)

PARALLEL SENSORLESS CONTROLLER

☐ Pump Mounted

☐ Well Mounted

_____ Pumps in Parallel

TYPE OF SEAL

☒ Standard Seal

(Buna-Carbon/Ceramic)

-20° to 225° F (-29° to 107° C)

Max Working Pressure 175 psi (12 bar)

☐ -F Standard Seal w/ Flush Line

(Buna-Carbon/Ceramic)

-20° to 225° F (-29° to 107° C)

Max Working Pressure 175 psi (12 bar)

☐ -S Stuffing Box construction w/ Flushed Mechanical Single Seal

(EPR-Tungsten Carbide/Carbon)

-20° to 250° F (-29° to 121° C)

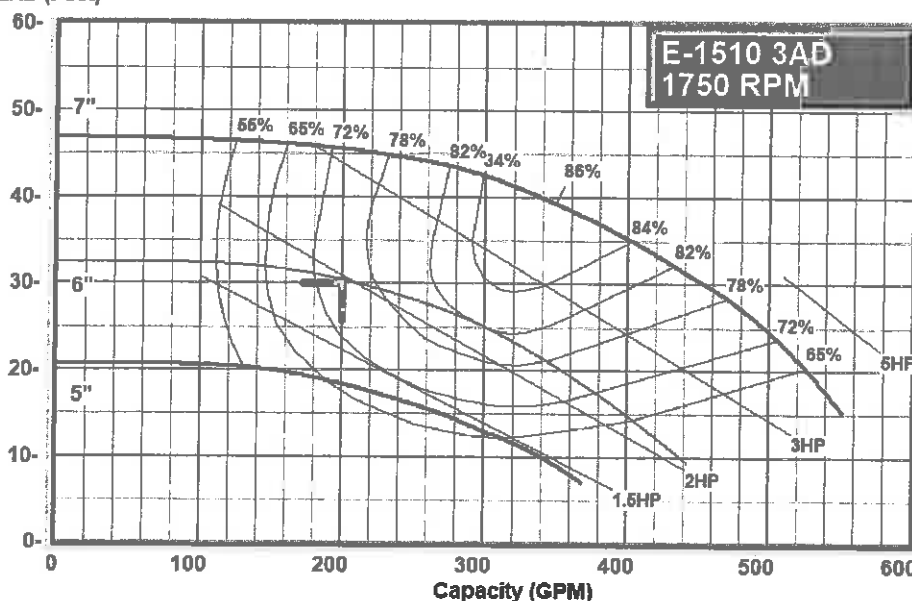
Max Working Pressure 175 psi (12 bar)

☐ -PF Stuffing Box Construction w/ Flushed Packing (Graphite Impregnated Teflon)

0° to 250° F (-17° to 121° C)

Max Working Pressure 175 psi (12 bar)

HEAD (Feet)



Design Capacity = 200.0 GPM
Design Head = 30.0 Feet

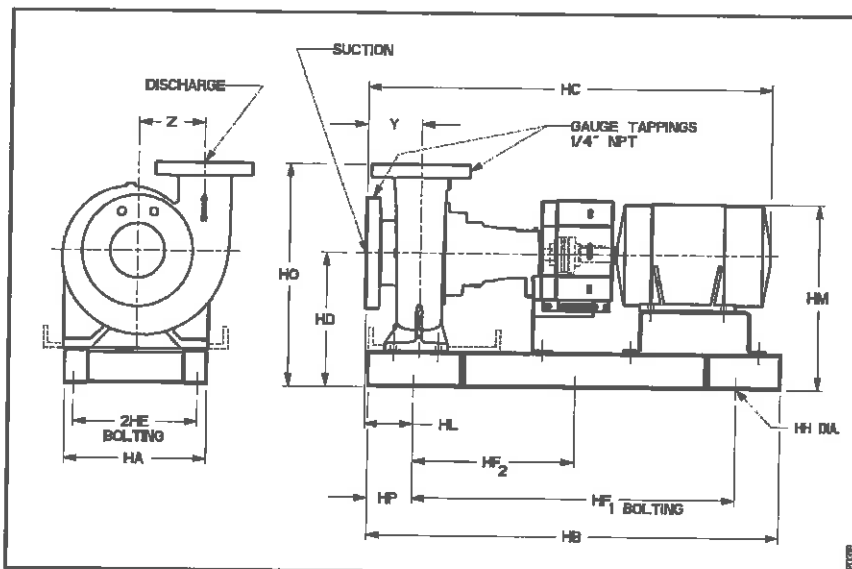
Suction Size = 4 "
Suct. Velocity = 5 fps
Discharge Size = 3 "
Disc. Velocity = 8.7 fps

Min. Imp. Dia. = 5 "
Max. Imp. Dia. = 7 "
Cut Dia. = 6 "

Max. Flow = 443 GPM
B.E.P. Flow = 299 GPM

Eff. @ Duty-Point = 75.47 %
Motor Size = 3 HP

B.H.P. @
Duty-Point = 2.03 BHP
Max. B.H.P. for
Imp. Cut = 2.34 BHP



FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	3"	.75 (19)	7.5 (181)
Suction	4"	.84 (24)	9" (229)

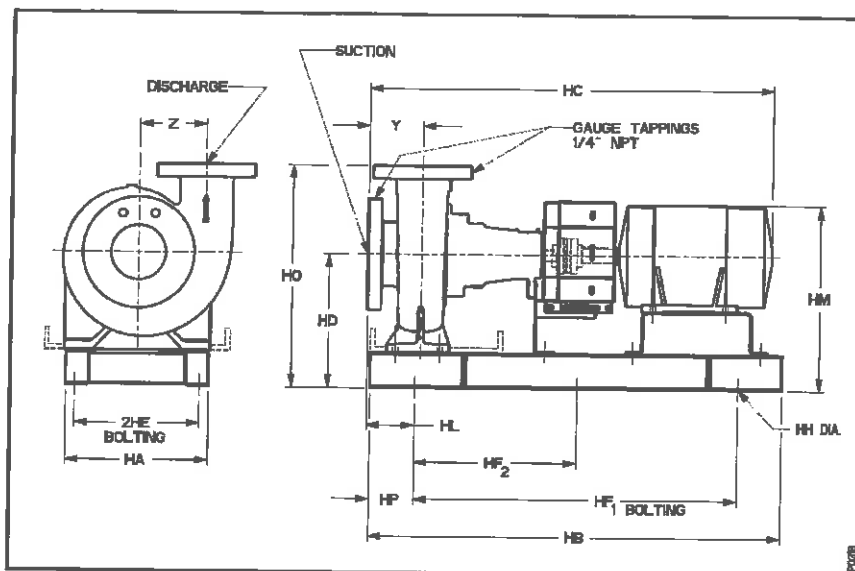
FLANGES ARE 125# ANSI - STANDARD

DIMENSIONS - Inches (mm)

STANDARD SEAL

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF ₁	HF ₂	HH	HL	HM MAX	HO	HP	Y	Z
"S" FRAME														
56	12 (305)	28.75 (730)	29.5 (748)	9.75 (248)	10.25 (260)	22.5 (572)	-	.75 (19)	4.31 (110)	13.38 (340)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
143T	12 (305)	28.75 (730)	29.83 (752)	9.75 (248)	10.25 (260)	22.5 (572)	-	.75 (19)	4.31 (110)	13.5 (343)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
145T	12 (305)	28.75 (730)	30.83 (778)	9.75 (248)	10.25 (260)	22.5 (572)	-	.75 (19)	4.31 (110)	13.5 (343)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
182T	14.63 (371)	31 (787)	33.38 (848)	9.75 (248)	12.88 (327)	25 (635)	-	.75 (19)	4.31 (110)	15 (381)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
184T	14.63 (371)	31 (787)	34.13 (867)	9.75 (248)	12.88 (327)	25 (635)	-	.75 (19)	2.94 (75)	15 (381)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
"L" FRAME														
215T	14.63 (371)	39.38 (1000)	42.83 (1083)	9.75 (248)	12.88 (327)	33.63 (848)	-	.75 (19)	2.94 (75)	15.38 (387)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
254T	16 (406)	46.5 (1181)	46.38 (1178)	12 (305)	14 (356)	36.5 (927)	18.25 (464)	.88 (22)	4.06 (103)	18.88 (478)	18 (457)	5 (127)	4.13 (105)	5 (127)
256T	16 (406)	46.5 (1181)	46.13 (1222)	12 (305)	14 (356)	36.5 (927)	18.25 (464)	.88 (22)	4.06 (103)	18.88 (479)	18 (457)	5 (127)	4.13 (105)	5 (127)
284TS	16 (406)	46.5 (1181)	47.38 (1203)	13 (330)	14 (356)	36.5 (927)	18.25 (464)	.88 (22)	4.06 (103)	21 (533)	18 (463)	5 (127)	4.13 (105)	5 (127)
286TS	16 (406)	46.5 (1181)	46.88 (1203)	13 (330)	14 (356)	36.5 (927)	18.25 (464)	.88 (22)	4.06 (103)	21 (533)	18 (463)	5 (127)	4.13 (105)	5 (127)
324TS	16 (406)	46.5 (1181)	50.88 (1292)	12 (305)	14 (356)	36.5 (927)	18.25 (464)	.88 (22)	4.06 (103)	21 (533)	18 (457)	5 (127)	4.13 (105)	5 (127)

Dimensions are subject to change. Not to be used for construction purposes unless certified.



FLANGE DIMENSIONS IN INCHES (MM)			
	SIZE	THICKNESS	O.D.
Discharge	3"	.75 (19)	7.5 (191)
Suction	4"	.84 (24)	9" (229)

FLANGES ARE 125# ANSI - STANDARD

DIMENSIONS - Inches (mm)

STUFFING BOX

MOTOR FRAME	HA	HB	HC MAX	HD	2HE	HF ₁	HF ₂	HH	HL	HM MAX	HO	HP	Y	Z
"S" FRAME														
56	14.63 (371)	34.63 (879)	33.13 (841)	9.75 (248)	12.88 (327)	28.63 (727)	-	.75 (19)	2.94 (75)	13.38 (340)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
143T	14.63 (371)	34.63 (879)	33.25 (845)	9.75 (248)	12.88 (327)	28.63 (727)	-	.75 (19)	2.94 (75)	13.5 (343)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
145T	14.63 (371)	34.63 (879)	34.25 (870)	9.75 (248)	12.88 (327)	28.63 (727)	-	.75 (19)	2.94 (75)	13.5 (343)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
182T	14.63 (371)	34.63 (879)	37 (940)	9.75 (248)	12.88 (327)	28.63 (727)	-	.75 (19)	2.94 (75)	15 (381)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
184T	14.63 (371)	34.63 (879)	37.75 (959)	9.75 (248)	12.88 (327)	28.63 (727)	-	.75 (19)	2.94 (75)	15 (381)	15.75 (400)	3 (76)	4.13 (105)	5 (127)
"L" FRAME														
215T	16 (406)	48.5 (1181)	45 (1143)	11 (279)	14 (356)	36.5 (927)	18.25 (464)	.88 (22)	4.06 (103)	18.88 (479)	17 (432)	5 (127)	4.13 (105)	5 (127)
254T	16 (406)	51.75 (1314)	48.75 (1238)	12 (305)	14 (356)	41.75 (1060)	20.88 (530)	.88 (22)	4.06 (103)	18.88 (479)	18 (457)	5 (127)	4.13 (105)	5 (127)
256T	16 (406)	51.75 (1314)	50.5 (1283)	12 (305)	14 (356)	41.75 (1060)	20.88 (530)	.88 (22)	4.06 (103)	18.88 (479)	18 (457)	5 (127)	4.13 (105)	5 (127)
284TS	16 (406)	51.75 (1314)	48.75 (1264)	13 (330)	14 (356)	41.75 (1060)	20.88 (530)	.88 (22)	4.06 (103)	21 (533)	19 (483)	5 (127)	4.13 (105)	5 (127)
286TS	16 (406)	51.75 (1314)	51.25 (1302)	13 (330)	14 (356)	41.75 (1060)	20.88 (530)	.88 (22)	4.06 (103)	21 (533)	19 (483)	5 (127)	4.13 (105)	5 (127)

Dimensions are subject to change. Not to be used for construction purposes unless certified.

MAN. NO. CIPM#GES78
DATE: 2/26/2019

VENDOR VOUCHER MANIFEST
SCHOOL DISTRICT SAU #11

1. DATE	2. PAYEE NAME AND ADDRESS	3. FINANCE PO NO:	4. AMOUNT EXPENDED	5. AMOUNT OF CHECK	6. PROJECT NAME
1. 2/26/2019	Harriman 46 Harriman Drive Auburn, ME 04210				
Line #1	4017.1.600.46900.4725.07103.17.000.000.700	201707153		\$ 3,960.00	Fee
Line #2	4017.1.600.46900.4725.07103.17.000.000.700	201707153		\$ 86.77	Reimb
	Professional Services from 1/1/2019-1/31/2019 for Phase 1 Design (Construction Administration) and Reimburseable Expenses			\$ 4,046.77	Inv#1901069
TOTALS				\$4,046.77	

TO THE TREASURER; PAYMENTS AUTHORIZED AND ORDERED
TO THE PERSONS LISTED ABOVE FOR THE SUMS INDICATED
IN COLUMN 5. AMOUNT OF CHECK AMOUNTING IN THE
AGGREGATE TO:

4,046.77

Superintendent of Schools or Business Administrator

Date

Dennis Ciotti, City Councilor, JBC Chair

Date



46 Harriman Drive
Auburn, ME 04210
207.784.5100 telephone
INVOICE

William Harbron, Ed.D.
Superintendent of Schools
Dover School District
McConnell Center
61 Locust Street, Suite 409
Dover, NH 03820

January 31, 2019
Project No: 15618
Invoice No: 1901069

Project 15618 Dover School District, Garrison Elementary School Facilities Study
l.simmons@dover.k12.nh.us

Professional Services from January 1, 2019 to January 31, 2019

Phase	00A	Base Fees - Phase 1 Design				
Fee						
Billing Phase	Fee	Percent Complete	Earned	Previous Fee Billing	Current Fee Billing	
Schematic Design	74,250.00	100.00	74,250.00	74,250.00	0.00	
Design Development	99,000.00	100.00	99,000.00	99,000.00	0.00	
Construction Documents	198,000.00	100.00	198,000.00	198,000.00	0.00	
Bidding	24,750.00	100.00	24,750.00	24,750.00	0.00	
Construction Administration	99,000.00	74.00	73,260.00	69,300.00	3,960.00	
Expanded Design Scope	167,842.00	100.00	167,842.00	167,842.00	0.00	
Option 3 Fee Reconciliation	57,744.00	100.00	57,744.00	57,744.00	0.00	
Total Fee	720,586.00		694,846.00	690,886.00	3,960.00	
Total Fee						3,960.00
				Total this Phase		\$3,960.00

Phase	ZEXP	Expenses			
Reimbursable Expenses					
Rmb Travel					
1/15/2019	Cormier, Jeffrey	Boiler Room Investigation - Mileage	78.88		
	Total Reimbursables	1.1 times	78.88		86.77
		Total this Phase			\$86.77
		Total this Invoice			\$4,046.77

TERMS: Net 30 Days 1.5% Interest (18% Annually) will be charged on accounts over 30 days past due.

MAN. NO. CIPM#GES79
DATE: 2/26/2019

VENDOR VOUCHER MANIFEST
SCHOOL DISTRICT SAU #11

1. DATE	2. PAYEE NAME AND ADDRESS	3. FINANCE PO NO:	4. AMOUNT EXPENDED	5. AMOUNT OF CHECK	6. PROJECT NAME
1. 2/26/2019	Horizon Engineering Associates, LLP 800 Veterans Memorial Highway, Suite 301 Hauppauge, NY 11788-2948				
	<u>4017.1.600.46900.4725.07103.17.000.000.700</u>	201806242		\$ 710.00	Invoice #12
				\$ 710.00	
	Commissioning Services provided 12/1/2018-12/31/2018				
	Services include site visit conducting installation checks of the 3rd Wing and witnessing TAB of the new boiler pump.				
TOTALS				\$710.00	

TO THE TREASURER; PAYMENTS AUTHORIZED AND ORDERED
TO THE PERSONS LISTED ABOVE FOR THE SUMS INDICATED
IN COLUMN 5. AMOUNT OF CHECK AMOUNTING IN THE
AGGREGATE TO:

710.00

Superintendent of Schools or Business Administrator

Date

Dennis Ciotti, City Councilor, JBC Chair

Date

Invoice**Horizon Engineering
Associates LLP****800 Veterans Memorial Highway
Suite 301
Hauppauge, NY 11788-2948**Robin LaFleur
Dover School District
61 Locust Street
Suite 409
Dover, NH 03820December 31, 2018
Project No: R2018Z-166
Invoice No: 12Project R2018Z-166 Garrison Elementary School Renovations -
Professional Services from December 01, 2018 to December 31, 2018**Fee**

Total Fee	33,900.00		
Percent Complete	46.7847	Total Earned	15,860.02
		Previous Fee Billing	15,150.02
		Current Fee Billing	710.00
		Total Fee	710.00
		Current	Prior
Total Billings		710.00	15,150.02
Total Contract Amount			15,860.02
Contract Remaining			33,900.00
			18,039.98

Total this Invoice \$710.00 ✓**Outstanding Invoices**

Number	Date	Balance
10	11/2/2018	2,007.00
11	11/30/2018	1,090.02
Total		3,097.02

Total Now Due \$3,807.02

Remit to: Horizon Engineering Associates, 800 Veteran's Highway, Ste. 301, Hauppauge, NY 11788



Horizon Engineering
Associates LLC
Demand a Higher Standard.®

Garrison Elementary School Renovation Project
HEA Project Number: R2018Z-166

Monthly Invoice Description
Invoice # R2018Z-166-12

Invoice Period: December 2018
Cx Authority: Horizon Engineering Associates, LLP
Amount: \$710

Garrison Elementary School Renovation Project:

- Site visit conducting installation checks of the 3rd Wing and witnessing TAB of the new boiler pump.
- Internal project management. Field report generation and distribution.

MAN. NO. CIPM#GES80
DATE: 2/26/2019

VENDOR VOUCHER MANIFEST
SCHOOL DISTRICT SAU #11

1. DATE	2. PAYEE NAME AND ADDRESS	3. FINANCE PO NO:	4. AMOUNT EXPENDED	5. AMOUNT OF CHECK	6. PROJECT NAME
1. 2/26/2019	Optiv Security, Inc. P.O. Box 28216 Network Place Chicago, IL 60673-1282				
Line 2	<u>4017.1.600.46900.4725.07103.17.000.000.700</u>	201809882		\$ 4,200.00	Inv#72514
				\$ 4,200.00	
	Custom consulting services for WAPs - approved to pay by IT Director, Christy Prosser				
TOTALS				\$4,200.00	

TO THE TREASURER; PAYMENTS AUTHORIZED AND ORDERED
TO THE PERSONS LISTED ABOVE FOR THE SUMS INDICATED
IN COLUMN 5. AMOUNT OF CHECK AMOUNTING IN THE
AGGREGATE TO:

4,200.00

Superintendent of Schools or Business Administrator

Date

Dennis Ciotti, City Councilor, JBC Chair

Date



1144 15th Street, Ste 2900
Denver CO 80202

Ph: 303.298.0600
Fx: 303.298.0868
TIN# 43-1806449
DUNS# 01-946-6684

Invoice

PO# 201809882

Page 1 of 2

Please make electronic payment to:
Beneficiary: Optiv Security Inc.
Bank: JPMorgan Chase

Please send check payment to:
Optiv Security Inc.
P.O. Box 28216 Network Place
Chicago, IL 60673-1282

By Wire:
ABA: 021000021
Swift: CHASUS33
Account No: 679967237

Overnight address:
J.P Morgan
Optiv Security Inc.
131 S Dearborn, 6th Floor
Chicago, IL 60603

By ACH:
ABA: 102001017
Account No: 679967237

LOCKBOX 28216

Date 01/10/2019
Invoice # OAINV-72514
Terms Net 30
Due Date 02/09/2019
PO # Signed SOW 1024011
Sales Rep Saeger Fischer
Currency US Dollar
Exchange Rate 1.00

Attention: Christy Prosser

Bill To

Dover High School
61 Locust Street
Dover NH 03820

PO# Signed SOW 1024011

Ship to/Site Address/Project Information

Dover High School
61 LOCUST ST
McConnell Center Suite 409
Dover School Administrative Unit 11
DOVER NH 03820-3753

Project: 1590161 OP-1024011 SAU#11 Wireless Acc Points -
Aruba

Customer Notes:

*****PLEASE SEND REMITTANCE DETAILS TO AR@OPTIV.COM*****

Item	Description	Qty	Unit Price	Amount	Tax Rate	Charge Date
OPTIV-AIS-A RUBA-WIREL ESS-CUSTO M	Custom consulting services tied to Aruba - Wireless Name: Schiel, Doug Task: Consulting SKU: OPTIV-AIS-ARUBA-WIRELESS-CUSTOM Date: 12/12/2018 Hours: 5 Rate: 200.00 Amount: 1000.00 Name: Schiel, Doug Task: Consulting SKU: OPTIV-AIS-ARUBA-WIRELESS-CUSTOM Date: 12/13/2018 Hours: 3 Rate: 200.00 Amount: 600.00 Name: Schiel, Doug Task: Consulting SKU: OPTIV-AIS-ARUBA-WIRELESS-CUSTOM Date: 12/17/2018 Hours: 8	21	200.00	4,200.00	0.0%	12/12/2018

OK to PO
2/12/19

Garrison Project



1144 15th Street, Ste 2900
Denver CO 80202

Ph: 303.298.0600
Fx: 303.298.0868
TIN# 43-1806449
DUNS# 01-946-6684

Invoice

Page 2 of 2

Date

01/10/2019

Invoice #

OAINV-72514

Item	Description	Qty	Unit Price	Amount	Tax Rate	Charge Date
	Rate: 200.00 Amount: 1600.00 Name: Schiel, Doug Task: Consulting SKU: OPTIV-AIS-ARUBA-WIRELESS-CUSTOM Date: 12/21/2018 Hours: 5 Rate: 200.00 Amount: 1000.00					

- Thank you for your business. If you have any questions regarding this invoice, please contact Optiv Accounts Receivable at ar@optiv.com, 303-298-0600.

- Optiv invoices for product sales upon receipt of an approved purchase order or signed agreement. All invoices are due on or before the due date listed on this invoice. Any invoice not paid on or before the due date will be subject to a 1.5% late charge per month.

- All sales are final. Manufacturer's warranty applies. Optiv shall have no liability or responsibility for any loss or damage connected with the sale or use of the product.

-The parties hereby incorporate the requirements of 41 C.F.R. § 60-1.4(a) and 29 C.F.R. § 471, Appendix A to Subpart A, if applicable. This contractor and subcontractor shall abide by the requirements of 41 CFR 60-300.5(a) and 41 CFR 60-741.5(a), if applicable. These regulations prohibit discrimination against qualified protected veterans and qualified individuals with disabilities, and require affirmative action by covered prime contractors and subcontractors to employ and advance in employment qualified protected veterans and qualified individuals with disabilities..

Total	4,200.00
Amount Due	\$4,200.00

GARRISON ELEMENTARY SCHOOL - COMMITTEE FINANCIAL REPORT
(NOTE: WORKING BUDGET FOR THE PURPOSE OF FINANCIAL PLANNING BY JBC)

		Budget	Actual Contract Amount	Net Amount	
Construction Costs					
1	Harvey Construction, Preconstruction (COMPLETE)	\$30,744.00	\$30,744.00		Adjusted based on current construction budget
		\$30,744.00	\$30,744.00		
2	Harvey Construction, GMP (Original Contract Sum)	\$6,148,800.00	\$6,148,800.00		Per contract dated 11/21/2017
3	Harvey Construction, Change Order 001 (Alternate 6, HVAC)	\$393,319.00	\$393,319.00		Per JBC approval 2/13/2018
4	Harvey Construction, Change Order 005 (Infill Skylight)	\$5,684.00	\$5,684.00		Per JBC approval 4/10/2018
5	Harvey Construction, Change Order 006 (Admin Area Reno)	\$56,544.82	\$56,544.82		Per JBC approval 4/24/2018
6	Harvey Construction, Change Order 008 (Fire Alarm Mod, Voice Amp, WAP)	\$6,209.69	\$6,209.69		Per JBC approval 5/8/2018
7	Harvey Construction, Change Order 010 (Incorporate Corridor Cubbies)	\$70,448.60	\$70,448.60		Per JBC approval 5/22/2018
8	Harvey Construction Change Order 11, 12, 13 (Café reno, etc)	\$133,846.34	\$133,846.34		Per JBC approval 6/5/2018
9	Harvey Construction Change Order 013 (Electrical Room 161 Panel Relocation)	\$7,134.94	\$7,134.94		Per JBC approval 7/3/2018
10	Harvey Construction Change Order 014 (PCO#16, 17, 18, 19, 24)	\$63,923.09	\$63,923.09		Per JBC approval 7/17/2018
11	Harvey Construction Change Order 015 (Entr Emg Lighting; Backflow)	\$1,656.46	\$1,656.46		Per JBC approval 7/31/2018
12	Harvey Construction Change Order 016 (PCO#25,26,27,28,30,31,32,33)	\$68,581.49	\$68,581.49		Per JBC approval 9/25/2018
13	Harvey Construction Change Order 017 (PCO#34, 35, 36, 37, 39, 40, 41)	\$75,878.47	\$75,878.47		Per JBC approval 11/6/2018
14	Harvey Construction Change Order 018 (PCO#38,42,43,44,45,46,48,49)	-\$29,043.21	-\$29,043.21		Per JBC approval 11/20/2018
15	Harvey Construction Change Order 019 (PCO#50, 51)	\$12,350.03	\$12,350.03		Per JBC approval 1/15/2019
16	Harvey Construction Change Order 020 (PCO#47, 52)	\$1,514.29	\$1,514.29		Per JBC approval 1/29/2019
17	Placeholder for Harvey Construction PCO#53	\$6,239.58	\$6,239.58		Per JBC approval 2/12/2019
		\$7,023,087.59	\$7,023,087.59		
	Subtotal	\$7,053,831.59	\$7,053,831.59	\$0.00	
18	Kelley Brothers of New England, Cores (COMPLETE)	\$3,494.40	\$3,494.40		Per JBC approval 10/9/2018
		\$3,494.40	\$3,494.40	\$0.00	
19	C&W Services , Post Construction Clean-up (COMPLETE)	\$1,799.28	\$1,799.28		Per JBC approval 11/6/2018 (credit back from Harvey PCCO#018)
		\$1,799.28	\$1,799.28	\$0.00	
20	D.M. Burns Security-relocate rear hallway keypad & motion detectors	\$2,200.00	\$2,200.00		Per JBC approval 1/29/2019
		\$2,200.00	\$2,200.00	\$0.00	
Architect / Engineer Services					
21	Harriman Architects, Facilities Study (COMPLETE)	\$49,936.00	\$49,936.00		Per contract dated 5/26/2016 (includes \$1,900 in reimb exp)
		\$49,936.00	\$49,936.00		
22	Harriman Architects, Phase I Design (Lump Sum)	\$495,000.00	\$495,000.00		Per JBC approval 1/31/2017
23	Harriman Architects, A/E Basic Services	\$225,586.00	\$225,586.00		Per JBC approval 1/30/2018 (AIA Amend#2 signed 2/27/2018)
		\$720,586.00	\$720,586.00		
24	Harriman Architects, Phase I Design (Reimbursables)	\$30,000.00	\$30,000.00		Per JBC approval 1/31/2017
		\$30,000.00	\$30,000.00		
	Subtotal	\$800,522.00	\$800,522.00	\$0.00	
Survey & Soils					
25	John Turner Consulting, Geotechnical Investigation (COMPLETE)	\$7,000.00	\$7,000.00		Per JBC approval 3/28/2017
26	Titcomb Associates, Topo/Boundary Field Survey (COMPLETE)	\$9,100.00	\$9,100.00		Per JBC approval 2/14/2017
27	Titcomb Associates, Wetland Delineation (COMPLETE)	\$2,000.00	\$2,000.00		Per JBC approval 4/13/2017
28	Balance remaining in estimated budget	\$36,900.00	\$0.00		Budget Only
	Subtotal	\$55,000.00	\$18,100.00	\$36,900.00	
Construction Testing					
29	Desmarais Environmental, Industrial Hygiene (COMPLETE)	\$1,960.00	\$1,960.00		Per 8/23/2017 proposal
30	S.W. Cole, Construction Materials Testing	\$3,200.00	\$3,200.00		Per JBC approval 1/3/2018
31	John L. Carter Sprinkler, MIC Testing (COMPLETE)	\$2,370.00	\$2,370.00		Per JBC approval 8/15/2017
32	Desmarais Environmental, Abatement (Lump Sum) (COMPLETE)	\$13,000.00	\$13,000.00		Per JBC approval 12/19/2017
33	Desmarais Environmental, Abatement (Add'l fees) (COMPLETE)	\$9,501.00	\$9,501.00		Per JBC approval 4/10/2018; 5/8/2018, 1/29/2019
34	Desmarais Environmental, Abatement (Add'l fees) (COMPLETE)	\$13,840.00	\$13,840.00		Per JBC approval 7/31/2018
35	Moisture Testing, concrete floors (conducted by ACC for HCC)	\$2,200.00	\$0.00		Invoice(s) pending
	Subtotal	\$46,071.00	\$43,871.00	\$2,200.00	
Commissioning Agent Services					
36	Horizon Engineering Associates	\$50,000.00	\$37,180.00		Per JBC approval 1/12/2018
	Subtotal	\$50,000.00	\$37,180.00	\$12,820.00	

GARRISON ELEMENTARY SCHOOL - COMMITTEE FINANCIAL REPORT
(NOTE: WORKING BUDGET FOR THE PURPOSE OF FINANCIAL PLANNING BY JBC)

		Budget	Actual Contract Amount	Net Amount	
Clerk of Works					
37	Michael Brooks/Stephanie Parsons	\$35,000.00	\$35,000.00		Budget Only
	Subtotal	\$35,000.00	\$35,000.00	\$0.00	
Contingency & Miscellaneous Costs					
38	Project Contingency	\$316,560.00	\$316,560.00		Budget Only
39	Adjustment for Harvey Construction, Change Order 001	-\$83,118.64	-\$83,118.64		Net amount needed for CO#1 (HVAC)
40	Adjustment for Harriman A/E Reimbursables	-\$24,536.00	-\$24,536.00		Per JBC approval 4/10/2018
41	Adjustment for Harvey Construction, Change Order 005	-\$5,684.00	-\$5,684.00		Per JBC approval 4/10/2018
42	Transfer from Permitting Fees Budget	\$75,000.00	\$75,000.00		Transfer per JBC 4/10/2018
43	Transfer from Advertising/Legal Budget	\$45,000.00	\$45,000.00		Transfer per JBC 4/10/2018
44	Adjustment for Harvey Construction, Change Order 006	-\$56,544.82	-\$56,544.82		Per JBC approval 4/24/2018
45	Adjustment for Harvey Construction, Change Order 008	-\$6,209.69	-\$6,209.69		Per JBC approval 5/8/2018
46	Adjustment for Harvey Construction, Change Order 010	-\$70,448.60	-\$70,448.60		Per JBC approval 5/22/2018
47	Harvey Construction Change Order 11, 12, 13 (Café reno, etc)	-\$133,846.34	-\$133,846.34		Per JBC approval 6/5/2018
48	Harvey Construction Change Order 013 (Electrical Room 161 Panel Relocation)	-\$7,134.94	-\$7,134.94		Per JBC approval 7/3/2018
49	Harvey Construction Change Order 014 (PCO#16, 17, 18, 19, 24)	-\$63,923.09	-\$63,923.09		Per JBC approval 7/17/2018
50	Harvey Construction Change Order 015 (Entr Emg Lighting; Backflow)	-\$1,656.46	-\$1,656.46		Per JBC approval 7/31/2018
51	Balance remaining for Desmarais Environmental Add'l Testing	-\$6,071.00	-\$6,071.00		Per JBC approval 7/31/2018, 1/29/2019
52	Optiv Security (POE+ Switches for outside cameras)	-\$5,230.90	-\$5,230.90		Per JBC approval 8/28/2018 (Bal from contingency)
53	Harvey Construction Change Order 016 (PCO#25,26,27,28,30,31,32,33)	-\$68,581.49	-\$68,581.49		Per JBC approval 9/25/2018
54	Kelley Brothers of New England, Cores	-\$3,494.40	-\$3,494.40		Per JBC approval 10/9/2018
55	Harvey Construction Change Order 017 (PCO#34, 35, 36, 37, 39, 40, 41)	-\$75,878.47	-\$75,878.47		Per JBC approval 11/6/2018
56	C&W Services , Post Construction Clean-up	-\$1,799.28	-\$1,799.28		Per JBC approval 11/6/2018 (credit back from Harvey PCCO#018)
57	Harvey Construction Change Order 018 (PCO#38,42,43,44,45,46,48,49)	\$29,043.21	\$29,043.21		Per JBC approval 11/20/2018
58	Harvey Construction Change Order 019 (PCO#50, 51)	-\$12,350.03	-\$12,350.03		Per JBC approval 1/15/2019
59	Harvey Construction Change Order 020 (PCO#47, 52)	-\$1,514.29	-\$1,514.29		Per JBC approval 1/29/2019
60	D.M. Burns Security-relocate rear hallway keypad & motion detectors	-\$2,200.00	-\$2,200.00		Per JBC approval 1/29/2019
61	Placeholder for Harvey Construction PCO#53	-\$6,239.58	-\$6,239.58		Per JBC approval 2/12/2019
62	Optiv Security (replacement of damaged switch during construction)	-\$2,620.32	-\$2,620.32		Per JBC approval 2/12/2019
	Subtotal	-\$173,479.13	-\$173,479.13	\$0.00	
Moveable Equipment (FFE)					
63	Harriman - FFE Design Fees	\$13,400.00	\$13,400.00		Per JBC approval 1/30/2018 (AIA Amend#2 signed 2/27/2018)
64	FFE Purchases (Creative Office, School Furnishings, Virco)	\$170,848.00	\$170,845.10		Per JBC approval 5/22/2018
	Subtotal	\$184,248.00	\$184,245.10	\$2.90	
Technology					
65	Optiv Security (WAPs)	\$24,734.48	\$24,734.48		Per JBC approval 5/22/2018
66	Pro AV Systems (Classroom audio equipment)	\$51,813.32	\$51,813.32		Per JBC approval 5/22/2018
67	Ockers (Projectors w/installation)	\$106,344.00	\$106,344.00		Per JBC Approval 6/5/2018
68	Optiv Security (POE+ Switches for outside cameras)	\$6,587.10	\$6,587.10		Per JBC approval 8/28/2018 (Bal from contingency)
69	Optiv Security (replacement of damaged switch during construction)	\$2,620.32	\$2,620.32		Per JBC approval 2/12/2019
	Subtotal	\$192,099.22	\$192,099.22	\$0.00	
Advertising / Legal					
70		\$10,000.00	\$0.00		Maintain \$10K budget placeholder per JBC 4/10/2018
	Subtotal	\$10,000.00	\$0.00	\$10,000.00	
Energy Incentives/Rebates					
71	Eversource Lighting Rebate (2018 Calendar Year, Phasel)	\$0.00	-\$16,067.00		Rebate received/processed 1/25/2019
	Subtotal	\$0.00	-\$16,067.00	\$16,067.00	
Total Project, as of date of this report					
Total Approved Appropriation		\$8,260,786.36	\$8,260,786.36	\$61,922.90	
Remaining Balance		\$0.00	\$77,989.90		
Contingency, GMP & Unobligated					
Owners Contingency		\$ (173,479)			
Unobligated Funds, Owner		\$ 77,990			
<i>Owners Contingency & Unobligated Funds</i>		<i>\$ (95,489)</i>			
Harvey Contingency (a/o 12/31/2018 invoice)		\$ 282,631			
Contingency & Unobligated Funds		\$ 187,142			