WEAVER CONSTRUCTION MANAGEMENT, INC.
3679 S. Huron St., Suite 404
Englewood, CO 80110
Phone: (303) 789-4111 FAX: (303) 789-4310

SUBMITTAL TRANSMITAL

August 8, 2011
WCM Submittal No: 11322-001

PROJECT: **Harold Thompson Regional WRF**
Birdsall Rd.
Fountain, CO 80817
Job No. 2908

ENGINEER: **GMS, Inc.**
611 No. Weber St., #300
Colorado Springs, CO 80903
719-475-2935 Roger Sams

OWNER: **Lower Fountain Metropolitan Sewage Disposal District**
901 S. Santa Fe Ave.
Fountain, CO 80817
719-382-5303 James Heckman

CONTRACTOR: **Schloss Engineered Equipment, Inc.**
10555 E. Dartmouth Ave., Suite 230
Aurora, CO 80014
303-695-4500 Linda Wood

SUBJECT: Vortex Grit Chambers - Motor Data, Mechanical Components, Controls and General and Electrical Shop Drawings

SPEC SECTION: 11322 – Vortex Grit Chambers

PREVIOUS SUBMISSION DATES:

DEVIATIONS FROM SPEC: ___ YES _X_ NO

CONTRACTOR'S STAMP: This submittal has been reviewed by Weaver General Construction and approved with respect to the means, methods, techniques, & safety precautions & programs incidental thereto. Weaver General Construction also warrants that this submittal complies with contracted documents and comprises on deviations thereto:

Contractor's Stamp:	Engineer's Stamp:
Date: 8/8/11 Reviewed by: H.C. Myers (X) Reviewed Without Comments ( ) Reviewed With Comments ENGINEER'S COMMENTS:	

SCHLOSS ENGINEERED EQUIPMENT, INC.
10555 East Dartmouth Avenue, Suite 230 Aurora, Colorado 80014
(303) 695-4500 OFFICE FAX (303) 695-4507

SUBMITTAL

HAROLD D. THOMPSON
REGIONAL WATER RECLAMATION FACILITY
FOUNTAIN, COLORADO

SPECIFICATION SECTION 11322 – VORTEX GRIT CHAMBERS

SCHLOSS ENGINEERED EQUIPMENT, INC.
PROJECT NO. 1757-11

SUBMITTAL

TABLE OF CONTENTS

SECTION I

COMMENTS

SUBMITTAL COMMENTS

HAROLD D. THOMPSON REGIONAL WATER RECLAMATION FACILITY
FOUNTAIN, COLORADO

ENGINEER: GMS, INC.
CONTRACTOR: WEAVER GENERAL CONSTRUCTION

SPECIFICATION SECTION 11322 – VORTEX GRIT CHAMBERS

SCHLOSS ENGINEERED EQUIPMENT, INC.
PROJECT NO. 1757-11

Schloss Engineered Equipment, Inc. (SEE) is submitting on two (2) Type 12CPT grit collectors and a control panel for the above referenced project. Included with this submittal are general arrangement drawings, electrical arrangement drawings and catalog information. The following comments are furnished in direct response to the above referenced specification section, however, comments are provided only for clarification or exception.

2.1.A The following design parameters were utilized:

1.	Initial average day flow"	0.75 MGD
2.	Initial peak hour flow:	1.3875 MGD
3.	Design average day flow:	2.5 MGD
4.	Design peak flow:	4.625 MGD
5.	Future average day flow:	4.25 MGD
6.	Future peak hour flow:	7.8625 MGD
7.	Future build-out average day flow:	6.00 MGD
8.	Future build-out peak hour flow:	11.1 MGD
9.	Continuous feed	

2.1.D.4 SEE includes the inlet baffle to control flow into the grit chamber. The specified outlet baffle is patented by the named manufacturer in an effort to achieve sole source procurement and exorbitant pricing. It isn't necessary for the specified performance of the grit collectors, and won't be provided by SEE. Please refer to General Arrangement Drawing #1757-11-A1.

2.1.D.9. The design removal of material (2.65 SG) at specified future peak hour flow:

a. 95% of grit greater than 50 mesh
b. 85% of grit greater than 70 but not less than 50 mesh
c. 65% of grit greater than 100 but not less than 70 mesh
d. The removal efficiency shouldn't decrease for flow rates less than the design flow.

2.1.F The propeller will consist of blades bolted to arms and a hub on the drive shaft. SEE utilizes and is submitting a C1045 steel drive shaft in lieu of the tube. The propeller blades will have an adjustable diameter which imparts more energy into the water as a function of r^3 versus adjustable pitch blades which impart energy as a linear function of the pitch.

2.1.G SEE utilizes a more efficient, lower maintenance drive configuration which doesn't require a bull gear or spur gear pinion. The speed reducer design demand service factor will be approximately 4.95. Please refer to the attached speed reducer catalog

information. The design demand L-10 bearing life will far exceed 20 years. A lubrication sight glass will be provided. The rotative speed will be approximately 20 rpm.

2.2 As previously discussed with Mr. Roger Sams with GMS, SEE strongly recommends that the drive shaft be blasted and painted in lieu of hot dipped galvanized. Hot dip galvanizing causes warping and SEE recommends that the rotating drive shaft be straight.

2.3.B The grit fluidization device will be connected to the end of the propeller drive shaft. Please refer to attached General Arrangement Drawing #1757-11-A1. Checkered plate by contractor.

2.3.C As previously discussed, a C1045 steel drive shaft will be utilized in lieu of a tube.

2.3.D As previously discussed, the motor will be direct connected to the speed reducer and won't require a bull gear. The motor will be 1.5 horsepower, 480V, 60 Hz, 3 phase, Class 1, Division 1, Group D. Please refer to attached catalog information.

2.4 Please refer to attached General Arrangement Drawing #1757-11-A1.

2.5 Anchor bolts by contractor.

2.6 As directed by Mr. Roger Sams with GMS, SEE is submitting a single NEMA 12 control panel for the grit system. Please refer to attached Electrical Arrangement Drawings #1757-11-A2, A3, A4 & A5.

2.7 The following spare parts will be provided:

A. one set seals and gaskets for the speed reducer
B. one set replacement bearings for speed reducer

3.2 Installation, lubricants and finish paint by others. Please confirm that proposed prime paint shown on General Arrangement Drawing #1757-11-A1 will be compatible with field finish paint by others.

3.3 & 3.4 SEE will provide a factory trained technician for start up, testing and training. Please note that SEE can't legally supervise the installation/erection work of others.

Contractor to verify voltage and all dimensions. 8/4/11

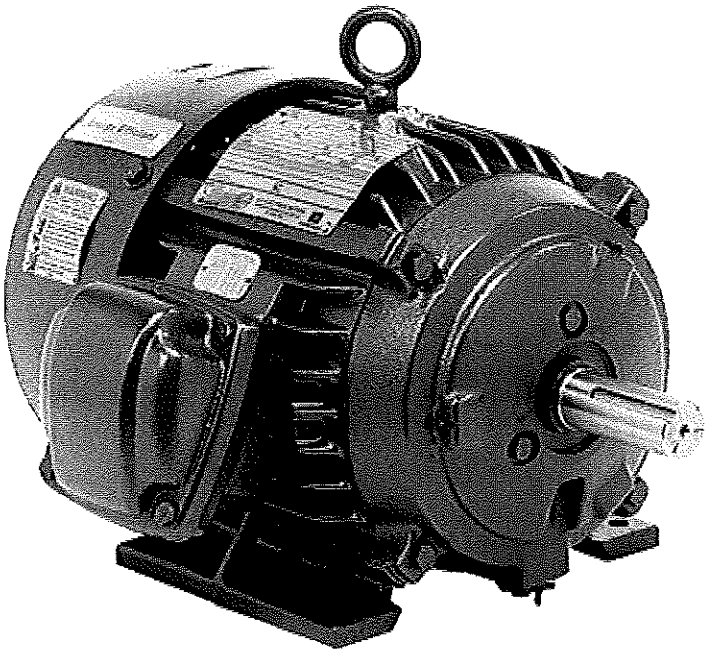
SECTION II

MOTOR

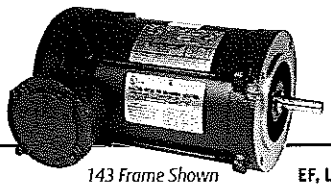
NIDEC MOTOR COPORATION

www.nidec-motor.com

Hazardous Location
- Single and three phase, TEFC
- 1/4 HP through 150 HP
- 3600, 1800, 1200 and 900 RPM
- 56 through 445 frame
- Energy and premium efficient
- Class I Group D; Class I, Groups C and D, and Class II, Groups E, F and G



General Purpose Three Phase, Totally Enclosed Fan Cooled (TEFC) Div. 1 Hazardous Location, Standard & Energy Efficient, Dual & Single Label, C-Face



143 Frame Shown

EF, LF
PH63

APPLICATIONS:

For pumps, fans, compressors, conveyors and tools located in hazardous locations as defined by Class and Group.

FEATURES:

For all Products in this Section:

- UL® Listed & CSA® Certified
- Cast Iron Inner Bearing Caps (180 Frame & Larger
- 40°C Ambient, NEMA® Design B Performance (04)
- Regreasable Bearings, 180 Frame & Up
- Lifting Provisions, 180 Frame & Up
- Conversion Kits: Cast Iron Fan Cover (180 Frame & Up)
- Sealed Bearings 56-140, Shielded 180 Frame & Up
- Class, Group & Temp Code as Noted Below

For Catalog Numbers Beginning with "X" or "Y":

- Cast Iron Frame Except Where Noted
- Cast Iron End Brackets & Conduit Box
- Class F Insulation
- 1.00 Service Factor on 60 Hertz
- Stainless Steel Nameplate & Zinc Plated Hardware
- Shaft Slinger on Pulley End for IP54 Protection

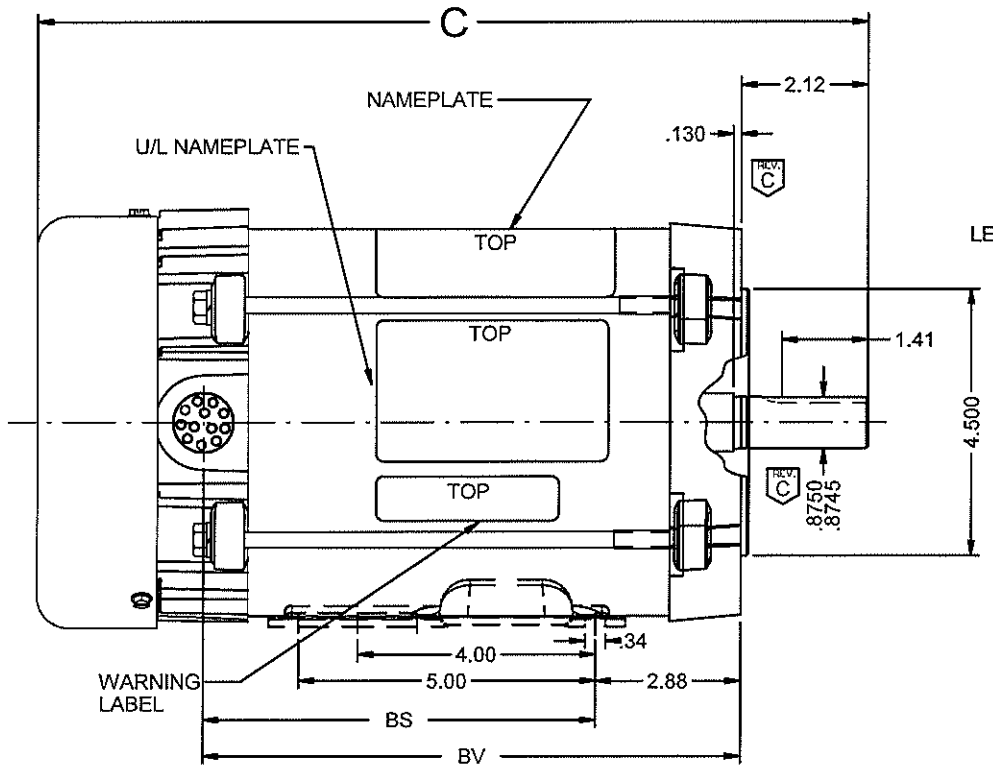
For Catalog Numbers Beginning with "XS":

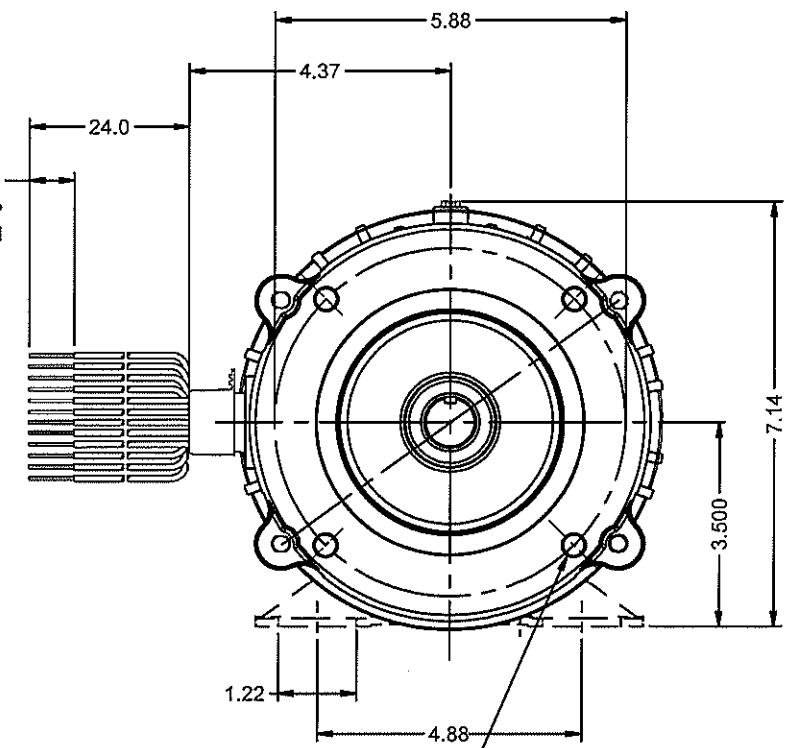
- Aluminum End Brackets & Conduit Box
- Class B Insulation

Footless

HP	RPM	Voltage	Frame	Catalog Number	Class I Group	Class II Group	Temp Code	List	Discount Symbol	"C" Dim. (inches)	Ship Wt. (lbs.)	Full Load Eff.	Full Load Amps	Notes
1/3	1800	208-230/460	56C	XS13SA2DCR	CD	EFG	T3C	$661	DS-3F	13.3	29	-	1.4-1.3/0.65	13, 24
	1800	230/460	56C	Y13S2BCR	D	-	T2B	$638	DS-3F	11.6	46	-	1.5/0.7	
1/2	1800	208-230/460	56C	XS12SA2DCR	CD	EFG	T3C	$656	DS-3F	13.3	30	-	2.0-1.9/1.0	24
	1800	230/460	56C	Y12S2BCR	D	-	T2B	$672	DS-3F	11.6	48	-	1.7/0.9	
3/4	3600	208-230/460	56C	XS34S1ACR	CD	EFG	T3C	$692	DS-3F	13.3	34	-	2.7-2.6/1.3	24
	1800	230/460	56C	XS34SA2ACR	CD	EFG	T3B	$731	DS-3F	13.5	36	-	2.6/1.3	51
	1800	230/460	56C	Y34S2BCR	D	-	T2B	$708	DS-3F	11.6	52	-	2.7/1.3	
1	3600	208-230/460	56C	XS1S1ACR	CD	EFG	T3C	$700	DS-3F	13.8	36	-	3.2-3.0/1.5	24
	3600	230/460	56C	Y1S1BCR	D	-	T2B	$716	DS-3F	11.6	47	-	3/1.5	
	1800	208-230/460	143TC	XS1P2ACR	CD	EFG	T3B	$1,279	DS-3CX	15.3	43	85.5	3.3-3.3/1.6	51
1-1/2	1800	208-230/460	143TC	XS32S2ACR	CD	EFG	T3C	$1,175	DS-3CX	14.8	44	84.0	5.0-4.9/2.5	51
	1800	230/460	145TC	X32E2BCR	D	FG	T3B	$1,202	DS-3CX	13.2	75	84.0	2.1	
	1800	208-230/460	145TC	XS32P2ACR	D	FG	T3B	$1,351	DS-3CX	15.8	50	86.5	4.9-4.8/2.4	51
	1800	208-230/460	145TC	XS2E2ACR	CD	EFG	T3C	$1,430	DS-3CX	16.8	59	84.0	6.7-6.4/3.2	51
2	1800	208-230/460	145TC	XS2P2ACR	CD	EFG	T3C	$1,427	DS-3CX	15.8	50	86.5	6.2-6.0/3.0	51
	1800	230/460	145TC	X2E2BCR	D	FG	T3B	$1,344	DS-3CX	13.2	75	84.0	5.6/2.8	
	1800	230/460	182TC	X3E2BCR	D	FG	T3B	$1,472	DS-3CX	16.1	105	87.3	8.2/4.1	
3	1800	230/460	184TC	X5E2BCR	D	FG	T3B	$1,605	DS-3CX	16.1	118	87.5	12.8/6.4	
5	1800	230/460	213TC	X7E2BCR	D	FG	T3B	$2,198	DS-3CX	19.9	145	89.5	18.6/9.3	
7-1/2	1800	230/460	215TC	X10E2BCR	D	FG	T3B	$2,360	DS-3CX	19.9	170	89.5	25.6/12.8	
10	1800	230/460	254TC	X15E2BCR	CD	FG	T3C	$3,046	DS-3CX	25.4	300	91.0	37.0/18.5	

Note 04 On 60 Hertz Sine Wave power
Note 13 Steel Frame Construction
Note 24 Automatic Reset Thermal Overload Protector
Note 51 Equipped with Winding Thermostat





VAR	MODEL	CATALOG NO.	C	BS	BV	HP	VOLTS	HZ	RPM	BASE REQUIREMENT	PROTECTOR
001	PH63ZWACW-1057	XS2S2ACR	16.83	–	11.94	2	208-230/460	60	1725	NONE	THERMOSTAT
002	PH63ZWADM-1071	XS1S2ACR	14.33	–	9.94	1	208-230/460	60	1725	NONE	THERMOSTAT
003	PH63ZWADE-1064	XS32S2ACR	14.83	NA	9.94	1 1/2	208-230/460	60	1725	NONE	THERMOSTAT

NOTES:

1.) CONDUIT BOX SUPPLIED DETACHED.

ROTATION : REVERSIBLE

SHEET NUMBER	REV	REVISION RECORD FOR: ECO 234726
1 OF 1	C	ENDSHIELD BROKEN VIEW SECTION ADDED.
REVISION DATE		DIM ".013" ADDED.
25-MAY-07		

EMERSON Motor Technologies

ALL DIMENSIONS ARE FOR REFERENCE ONLY UNLESS TOLERANCE IS GIVEN.

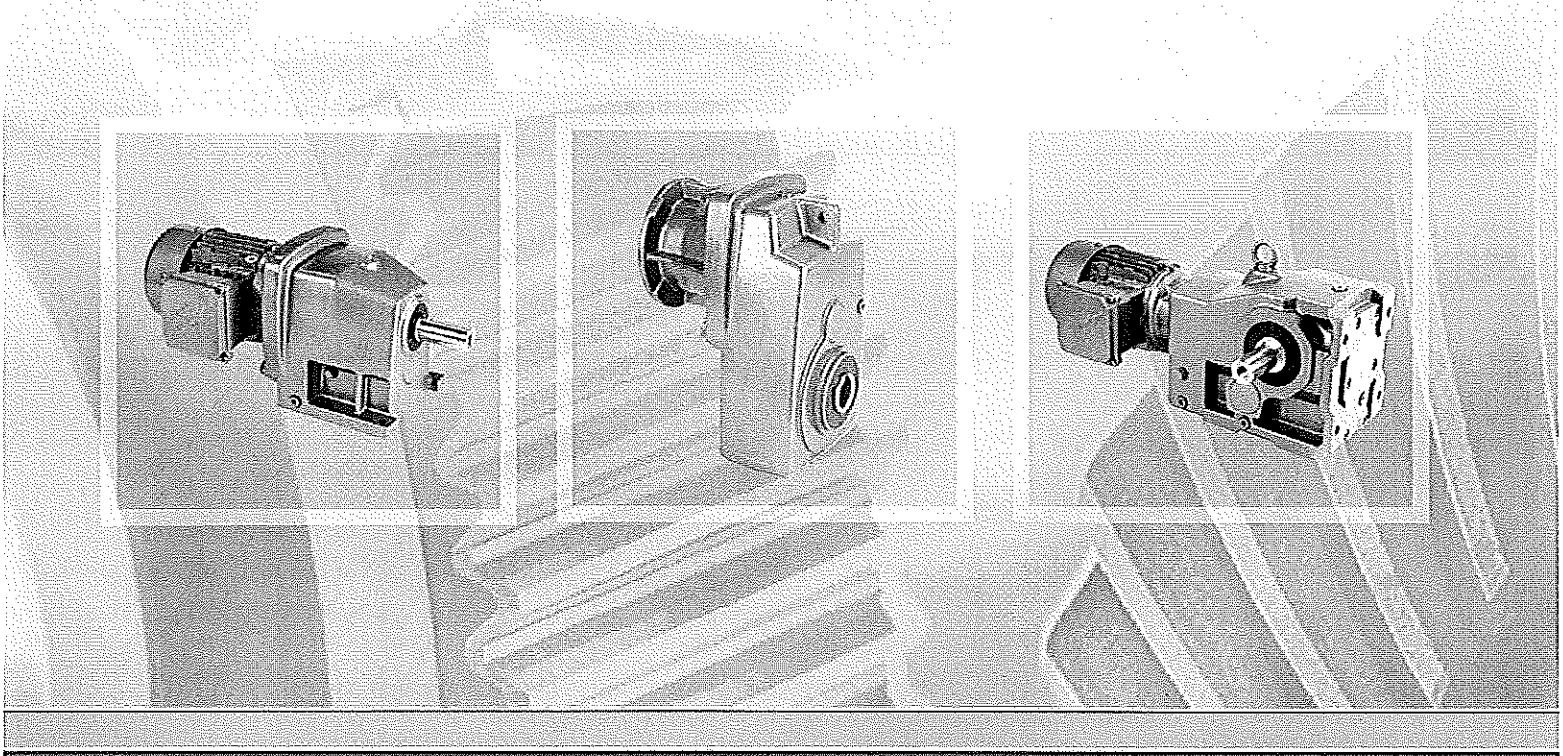
ISSUED BY	REVIEWED BY	ENGINEER APPROVED
J. HERNANDEZ	C. DOMINGUEZ	A. SERRANO

TITLE	CODE	ITEM NO.	SIZE
ASSEMBLED VIEW	V01	769711	B

SECTION III

MECHANICAL COMPONENTS

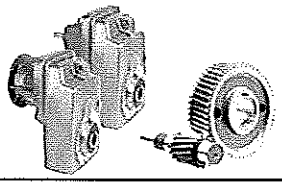
CONSTANT SPEED DRIVES



SIMPLE RELIABLE EFFICIENT

UNICASE™

NORD GEAR
DRIVESYSTEMS

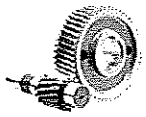


SK 4282
NEMA-C + W
Ratings & Combinations

Model Type	Gear Ratio	Output Speed	Output Torque*	Maximum input power◈ Solid input shafts type "W"				NEMA C-Face* Available Combinations							
				Input Speed											
	i_{tot}	n_2 1750 rpm	$T_{2\,max}$	1750 rpm	1150 rpm	875 rpm	580 rpm								
		[rpm]	[lb-in]	[hp]	[hp]	[hp]	[hp]	56C	140TC	180TC	210TC	250TC	280TC	320TC	360TC
SK 4282	4.70	372	9160	20.00	13.20	10.00	6.60			X	X	X			
	5.00	350	9160	20.00	13.20	10.00	6.60			X	X	X			
	5.43	322	9160	20.00	13.20	10.00	6.60			X	X	X			
	6.06	289	10620	20.00	13.20	10.00	6.60	X	X	X	X	X			
	7.13	245	10638	20.00	13.20	10.00	6.60	X	X	X	X	X			
	8.33	210	11257	20.00	13.20	10.00	6.60	X	X	X	X	X			
	9.23	190	14461	20.00	13.20	10.00	6.60	X	X	X	X	X			
	10.85	161	15045	20.00	13.20	10.00	6.60	X	X	X	X	X			
	12.68	138	15488	20.00	13.20	10.00	6.60	X	X	X	X	X			
	15.20	115	15930	20.00	13.20	10.00	6.60	X	X	X	X	X			
	18.18	96	15930	20.00	13.20	10.00	6.60	X	X	X	X	X			
	21.45	82	14921	19.41	12.81	9.71	6.41	X	X	X	X	X*			
	22.39	78	15036	18.61	12.28	9.30	6.14	X	X	X	X	X*			
	26.25	67	14231	15.13	9.98	7.56	4.99	X	X	X	X	X*			
	26.43	66	15815	16.56	10.93	8.28	5.47	X	X	X	X	X*			
	26.72	65	14160	14.60	9.64	7.30	4.82			X	X				
	32.04	55	15797	13.79	9.10	6.89	4.55			X	X				
	32.34	54	14337	12.28	8.11	6.14	4.05	X	X	X	X	X*			
	36.40	48	12169	9.27	6.12	4.63	3.06			X	X*				
	36.81	48	12390	9.44	6.23	4.72	3.11	X	X	X	X*				
	38.31	46	17700	12.92	8.53	6.46	4.26			X	X*				
	40.74	43	13771	9.40	6.20	4.70	3.10	X	X	X	X*				
	43.65	40	14160	8.99	5.93	4.49	2.97			X	X*				
	45.05	39	14107	8.73	5.76	4.36	2.88	X	X	X	X*				
	52.20	34	16089	8.68	5.73	4.34	2.86			X	X*				
	61.60	28	15877	7.05	4.66	3.53	2.33			X	X*				
	75.39	23	14063	5.13	3.39	2.57	1.69			X	X*				
	76.70	23	14063	5.13	3.39	2.57	1.69	X	X	X					
	90.52	19	14160	4.27	2.82	2.13	1.41	X	X	X*					
	110.78	16	14160	3.59	2.37	1.80	1.19	X	X	X*					
	155.40	11	11284	1.97	1.30	0.98	0.65	X	X*						

* Caution - The motor power may exceed the gear unit's mechanical torque capacity
◈ The mechanical power limit of the solid input shaft type "W" may limit the reducer rating.
All ratings are mechanical. See page 14 for thermal considerations.

lb	W	56C	140TC	180TC	210TC	250TC
SK 4282	165	154	170	170	201	223



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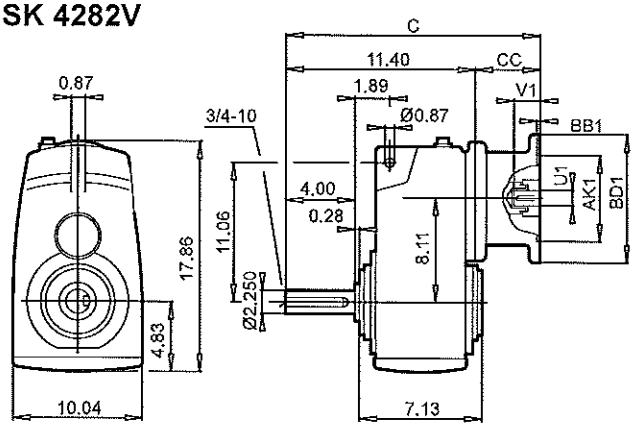

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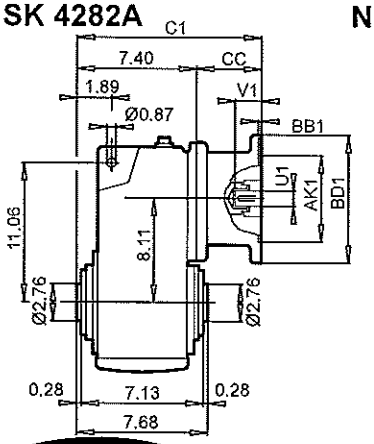
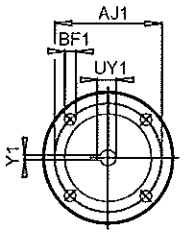


NEMA Input



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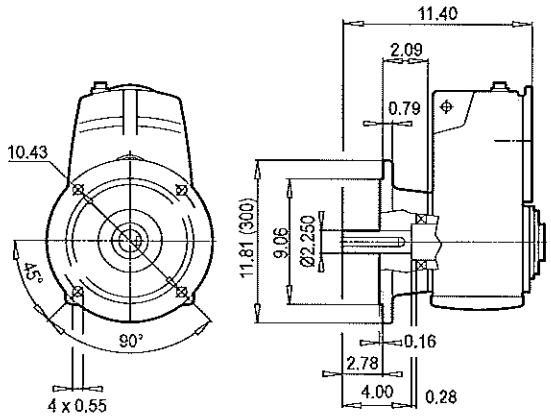

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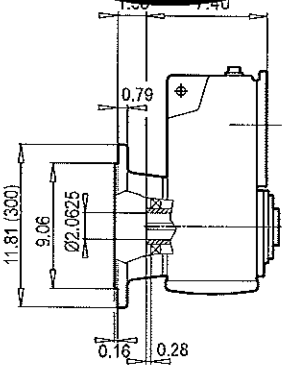

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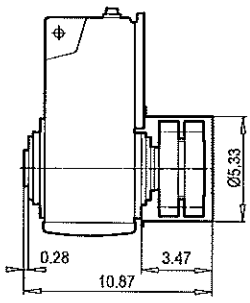

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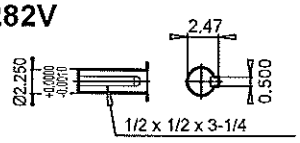

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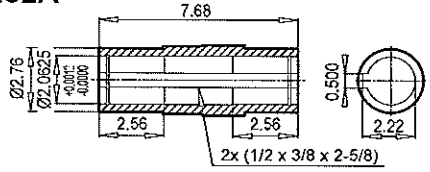

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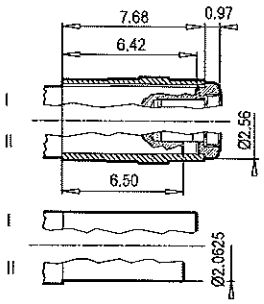

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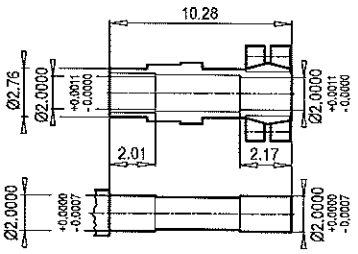


NEMA Dimensions

Type	AJ1	AK1	BB1	BD1	BF1	U1	V1	UY1	Y1	C	C1	CC
56C	5.88	4.500	0.18	6.54	0.43	0.625	2.06	0.71	0.188	15.74	11.74	4.30
140TC	5.88	4.500	0.18	6.54	0.43	0.875	2.12	0.96	0.188	15.74	11.74	4.30
180TC	7.25	8.500	0.23	9.17	0.59	1.125	2.62	1.24	0.250	19.34	15.34	7.90
210TC	7.25	8.500	0.39	9.17	0.59	1.375	3.12	1.52	0.312	19.34	15.34	7.90
250TC	7.25	8.500	0.23	9.17	0.59	1.625	3.75	1.80	0.375	19.34	15.34	7.90

ALTERNATE SHAFTS SEE PAGES 388 - 393

SECTION IV

CONTROLS

Second Generation CEP7 Solid State Overload Relays

Advanced solid state motor protection

The introduction of the second generation of CEP7 solid state overload relays advances Sprecher + Schuh's leading edge technology with several improved features. This second generation of CEP7 overload relay includes features like:

- Selectable trip class and field installable modules
- A wider (5:1) set current adjustment range
- A more robust mechanical and electrical mounting
- Self-sealed latching mechanism

The basic concept of utilizing Application Specific Integrated Circuits (ASICs) resulting in an affordable solid state overload relays remains unchanged. This kind of versatility and accuracy was simply not possible with traditional bi-metallic or eutectic alloy electromechanical overload relays.

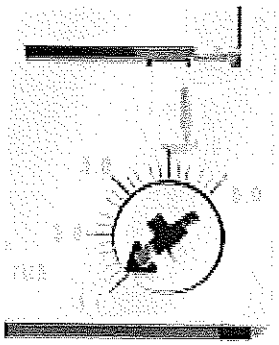
Fewer units means greater application flexibility

The new CEP7 is available in three basic models:

- CEP7-ED1 is a Class 10, manual reset model available up to 27 amperes which covers the most common horsepower motors and your every day application. This model is economically priced to be competitive with adjustable bi-metallic overload relays.
- CEP7-EE is full featured selectable trip class (10, 15, 20 & 30) 3-phase application overload relay with provision for field mountable modules to handle remote reset, stall and other modules previously available only in higher priced electronic overload relays. Manual reset or automatic reset can be selected with dip switches on the new CEP7-EE models.
- CEP7S-EE is a 1-phase application overload relay packing all features of the 3-phase CEP7-EE model.

Wide current adjustment range

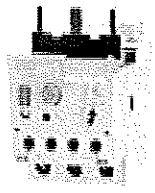
Thermal or bimetallic overload relays typically have a small current adjustment range of 1.5:1 meaning that the maximum setting is generally 1.5 times the lower setting. The



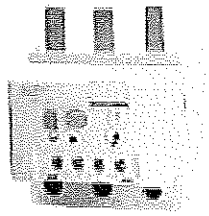
first generation of CEP7 caused the industry to take note of the flexibility when it introduced a 3.2:1 adjustment ratio. A wider adjustment range is the primary reason the industry has been turning to more specifications calling for electronic overload relay protection over thermal overload relays. Sprecher + Schuh building on field experience now introduces a CEP7 overload capable of adjustment to a maximum of five times the minimum set current which dramatically reduces the number of units required on-hand to cover the full range of current settings up to 90 amperes.

5 : 1 Current Range

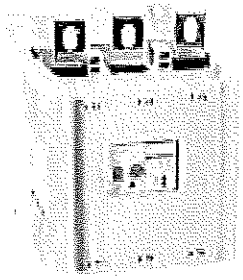
27A



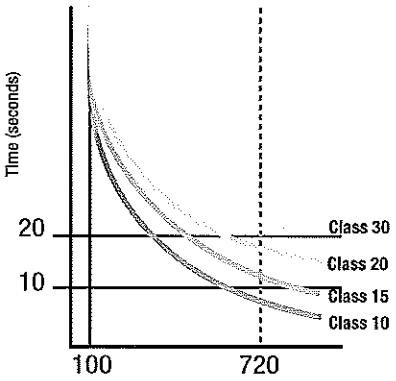
45A



90A



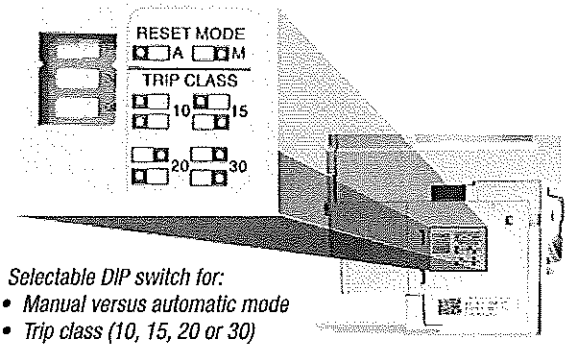
30A 800A



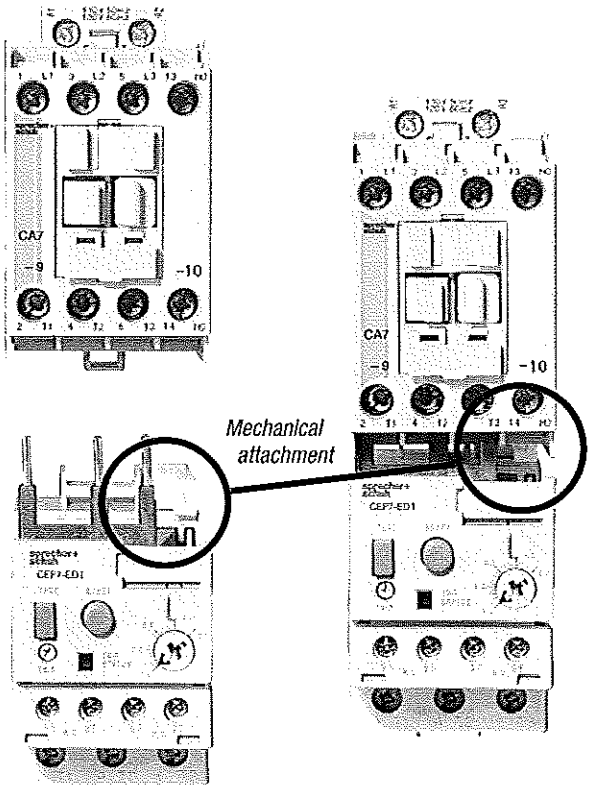
CEP7 overload relays are available with Class 10, 15, 20 or 30 tripping characteristics

Selectable tripping class

Because of today's lighter T-frame motors, Class 10 overload relays (relays that trip within 10 seconds of a locked rotor condition) have become the industry standard. If your application requires a longer motor run-up time. The new CEP7-EE Selectable Trip Class has DIP-switches providing Trip Class selection of 10, 15, 20 or 30 seconds. This ability allows you to closely match the Trip Class with the run-up time of the motor.



Selectable DIP switch for:
- *Manual versus automatic mode*
- *Trip class (10, 15, 20 or 30)*

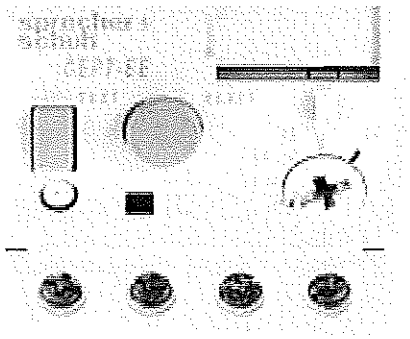


Choice of reset options

Most industrial applications usually calls for an overload relay that must be manually reset in the event of a trip. This allows the cause of the overload to be identified before the motor is restarted. In specialized cases, however, such as rooftop AC units or where restarting the motor will not harm people or equipment, automatic reset may be desired. CEP7-ED1 overload relays are available with Manual Reset exclusively which keeps the cost down. CEP7-EE models have a dip switch selectability in Manual and Automatic Reset modes.

More robust design

The CEP7 has been re-designed to physically extend to the back-pan therefore aligning the mounting of the overload with the corresponding contactor. Further, the mechanical attachment and direct electrical connection to the contactor has been "beefed-up." This provides for a more robust mounting which means less damage from shipping or during field wire installation. The bipolar latching relay which controls the normally closed trip contacts and normally open alarm circuit contacts have been self-enclosed therefore insolating the electro-magnet and shielding against airborne metal particles and other potential environmental debris. The new CEP7 has been tested to operate in -20° C. or up to 60° C (140 °F.) and withstand 3G of vibration or 30G of shock on a mountain up to an altitude of 2000m or in a jungle at 95% humidity. Reliability under every conceivable environmental condition is a quality built into the design of this second generation of CEP7 electronic overload relay.



Increased accuracy and improved motor protection

Microelectronics provides flexible and accurate motor overload protection. Unlike traditional overload relays that simulate heat build-up in the motor by passing current through a heater element, CEP7 solid state overload relays measure motor current directly through integrated current transformers. The transformers, in turn, create a magnetic field that induces DC voltage onto the ASIC board. The electronics identify excessive current or loss of phase more accurately, and react to the condition with greater speed and reliability, than traditional overload relays. In addition, CEP7 solid state relays offer setting accuracies from 2.5 – 5% and repeat accuracy of 1%.

Self-powered design means convenience

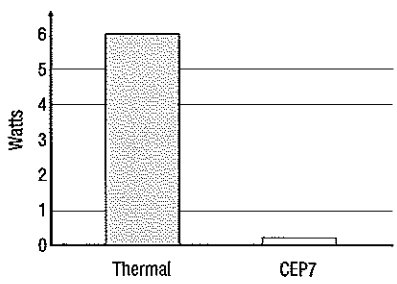
By developing the power it requires from the applied voltage, the CEP7 is "self-powered," eliminating the need for a separate control power source. This is not the case with some other competitive electronic overload relays. Since the CEP7 is self-powered and a traditional auxiliary contact is used to interface with the contactor, the user can apply the CEP7 the same way as an electromechanical overload. No special connections or control schematic diagram provisions are required in 3-phase applications.

Dramatically lowered energy requirement saves money, reduces panel space

Because traditional overload relays work on the principle of "modeling" the heat generated in the motor (recreating the heat in the bimetal elements or heaters), a significant amount of energy is wasted. In traditional bi-metallic overload relays, as many as six watts of heat are dissipated to perform the protective function. Because the CEP7 uses sampling techniques to actually measure the current flowing in the circuit, very little heat is dissipated in the device...as little as 150 milliwatts. This not only reduces the total amount of electrical energy consumed in an application, but it can also have a dramatic impact on the design and layout of control panels. The density of motor starters can be much greater because less heat is generated by each of the individual components. Higher density results in smaller control panels. In addition, special ventilation or air conditioning that might have been required to protect sensitive electronic equipment such as PLC's can now be reduced or eliminated. CEP7 overload relays dramatically reduced energy requirement saves money and reduces panel space.

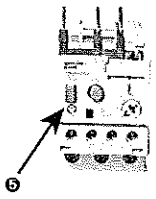
Superior phase failure protection

The CEP7's on-board electronics are constantly monitoring all three phases. If the ASIC board senses that one phase is missing during a steady state running condition on a fully loaded motor, it will trigger in 3 seconds. If a single phase condition is present during starting, the CEP7 will trip within 8 seconds (for a motor >80% loaded). These times are much faster than any thermal bi-metallic overload relay. In addition, CEP7 overload relays detect a 50% phase imbalance in the same way as a phase loss.



Conventional overload relays dissipate as much as six watts of energy compared with as little as 150 milliwatts for the CEP7

Directly Mounted CEP7 Solid State Overload Relays, Manual Reset ❶❷❹

Overload Relay	Directly Mounts to Contactor... ❷	Adjustment Range (A)	Trip Class 10	
			Catalog Number	Price
Manual Reset for 3Ø Applications ❶				
 ❺	CA7-9...CA7-23	0.1...0.5	CEP7-ED1AB	46
		0.2...1.0	CEP7-ED1BB	46
		1.0...5.0	CEP7-ED1CB	46
		3.2... 16	CEP7-ED1DB	46
		5.4...27	CEP7-ED1EB	46

Directly Mounted CEP7 Solid State Overload Relays, Automatic/Manual Reset ❶❷❸❹

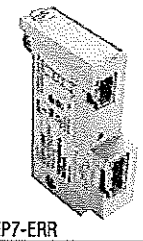
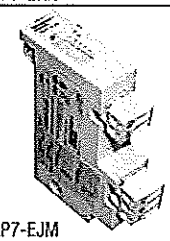
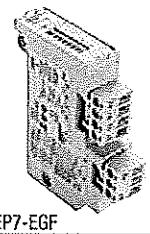
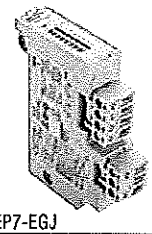
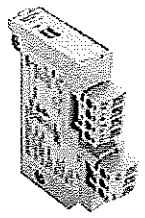
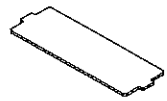
Overload Relay	Directly Mounts to Contactor... ❷	Adjustment Range (A)	Adjustable Trip Class 10, 15, 20 & 30	
			Catalog Number	Price
Automatic or Manual Reset for 3Ø Applications ❶				
	CA7-9...CA7-23	0.1...0.5	CEP7-EEAB	52
		0.2...1.0	CEP7-EEBB	52
		1.0...5.0	CEP7-EECB	52
		3.2... 16	CEP7-EEDB	52
		5.4...27	CEP7-EEEB	52
	CA7-30...CA7-43	1.0...5.0	CEP7-EECD	82
		3.2...16	CEP7-EEDD	82
		5.4...27	CEP7-EEED	82
		9...45	CEP7-EEFD	82
	CA7-60...CA7-85	5.4...27	CEP7-EEEE	95
		9...45	CEP7-EEFE	95
		18...90	CEP7-EEGE	100
Automatic or Manual Reset for 1Ø Applications ❶				
	CA7-9...CA7-23	1.0...5.0	CEP7S-EEPB	52
		3.2...16	CEP7S-EERB	52
		5.2...27	CEP7S-EESB	52
	CA7-30...CA7-43	9...45	CEP7S-EETD	95
	CA7-60...CA7-85	18...90	CEP7S-EEUE	100

TIP!

Most industrial applications usually call for an overload relay that must be manually reset in the event of a trip. This allows the cause of the overload to be identified before the motor is restarted. An overload relay that resets automatically is generally for specialized, or remote applications, such as rooftop AC units where restarting the motor will not harm people or equipment.

❶ 3-phase CEP7 units are only designed for 3Ø applications. Single phase CEP7S units are only designed for single phase applications.
❷ This reference is not intended to be a guide for selecting contactors. Size overload relays using the full load current of the motor.
❸ The reset time of a CEP7 set in the automatic mode is approximately 180 seconds.
❹ CEP7 overload relays do not work with Variable Frequency Drives, DC Applications or Softstarters with braking options.
❺ The mechanical trip actuator will become functional on shipments of CEP7 second generation starting April 2006. The exact date of Field availability may depend on levels of stock on-hand.

Accessories - CEP7 Side Mount Modules ❶❸

Accessory	Description	For use with...	Catalog Number	Price	
 CEP7-ERR	**Remote Reset Module** • Provision for reset after trip from remote pilot device	Side-mount to any CEP7-EE_ CEP7S-EE_	**CEP7-ERR**	60	IN STOCK NOW
 CEP7-EJM	**Jam Protection and Remote Reset Module** • Dip switch adjustable Jam Protection - Jam set points -150%, 200%, 300%, or 400% FLA - Trip delay- 0.5, 1, 2, or 4 sec. • Provision for reset after trip from remote pilot device		**CEP7-EJM**	70	IN STOCK NOW
 CEP7-EGF	**Ground Fault Protection and Remote Reset Module ❷** • Dip switch adjustable Ground Fault Protection > GF Current range set points - 20...100ma - 100...500mA - 0.2...1.0A - 1.0...5.0A > GF Trip level 20%-100% • LED status indication • Provision for reset after trip from remote pilot device	Side-mount to any CEP7-EE_ CEP7S-EE_	**CEP7-EGF**	70	IN STOCK NOW
 CEP7-EGJ	**Ground Fault/Jam Protection and Remote Reset Module ❷** • Dip switch adjustable Ground Fault Protection same as CEP7-EGF shown above. • Jam trip when the motor current exceeds 400% FLA setting when enabled. • LED status indication • Provision for reset after trip from remote pilot device	Must use with CEP7-CBCT_ Current Sensor	**CEP7-EGJ**	90	IN STOCK NOW
 CEP7-EPT	**PTC Thermistor Relay and Remote Reset Module** • PTC Protection and LED Status indication Type of Control Unit: Mark A Number of Sensors: 6 Maximum Cold Resistance of Sensor Chain: 1500 Trip Resistance: 3400 ± 150 Reset Resistance: 1600 ± 50 Short Circuit Trip Resistance: 25 ± 10 Open Circuit Trip Resistance: > 20,000 Maximum Voltage at 1T1 / 1T2 (Rptc=4k): < 7.5 Vdc Maximum Voltage at 1T1 / 1T2 (Rptc=open): < 30 Vdc PTC Response Time: 500ms...800ms • Provision for reset after trip from remote pilot device	Side-mount to any CEP7-EE_ CEP7S-EE_	**CEP7-EPT**	75	IN STOCK NOW
	**Adjustment Cover for External Modules**	All modules with DIP Switches	**CEP7-EMC**	4	IN STOCK NOW

❶ Side mount modules must have 24 - 240V, 47 - 63HZ or DC applied to terminals A1 and A2 for control power.
❷ ATTENTION: The CEP7 Overload relay is not a ground fault circuit interruptor for personnel protection as defined in Article 100 of the NEC.
❸ See page B11.1-B11.3 for Technical Data, Wiring, and DIP Switch set up.

Technical Information

Environmental Ratings

Ambient Temperature	Storage	[°C]	-40...+85 (-40...+185 °F)
	Operating	[°C]	-20...+60 (-4...+140 °F)
Humidity	Operating	[%]	5...95, non-condensing
	Damp Heat		per IEC 68-2-3 and IEC 68-2-30
Vibration (per IEC 68-2-6)		[G]	3
Shock (per IEC 68-2-27)		[G]	30
Maximum Altitude		[m]	2000
Pollution Environment			Pollution Degree 3
Degree of Protection			IP20
Type of Relay			Ambient compensated, time delay, phase loss standard
Nature of Relay			Solid-state
Trip Rating			120% FLA
Trip Class	Type ED		10
	Type EE		10, 15, 20, 30
Reset Mode	Type ED		Manual
	Type EE		Manual or Automatic

Electromagnetic Compatibility

Electrostatic Discharge Immunity	Test Level	[kV]	8kV air discharge 6kV contact discharge
	Performance Level		1 ❶❷
RF Immunity	Test Level	[V/m]	10 V/m
	Performance Level		1 ❶❷
Electrical Fast Transient Burst Immunity	Test Level	[kV]	4 kV
	Performance Level		1 ❶❷
Surge Immunity	Test Level	[V/m]	2 kV (L-E) 1 kV (L-L)
	Performance Level		1 ❶❷

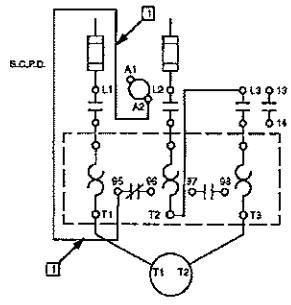
General

Standards	UL 508, CSA C22.2 No. 14, NEMA ICD2-1993 Part 4, EN 60947-4-1, EN 60947-5-1
Approvals	CSA, UL, ATEX (pending)

		CEP7-ED1...B CEP7-EE...B	CEP7-EE...D	CEP7-EE...E
Weights (unpackaged)	[Kg]	0.25	0.25	0.52
	[Lb]	0.55	0.55	1.06

Wire Schematics

Typical Wiring
for Single Phase Applications



CEP7 Single Phase Overload Relay
Must be connectd as shown in Fig. 1 or 2 only.

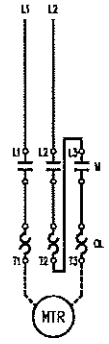


Fig. 1
Recommended connections for CEP7S (i.e. 240V motors)

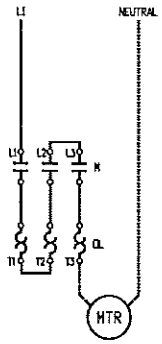


Fig. 2
Optional connections for CEP7S (i.e. ≤120V motors)

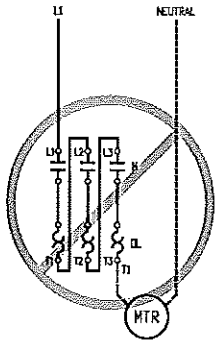


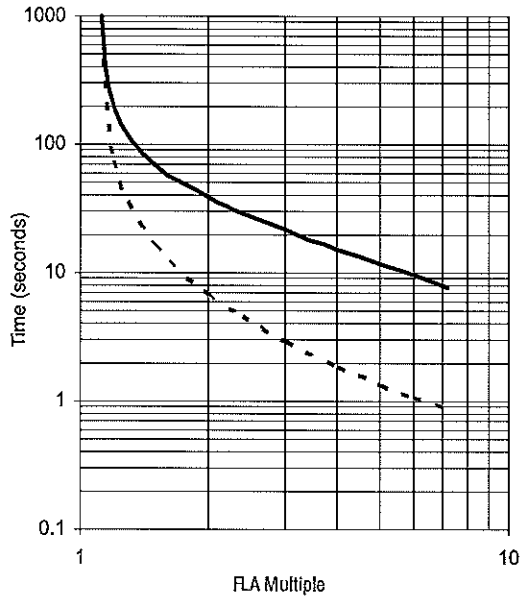
Fig. 3
❸ DO NOT USE

❶ Performance Criteria 1 requires the DUT to experience no degradation or loss of performance.
❷ Environment 2.
❸ If the CEP7S is connected as shown in Fig. 3 the overload will not trip! The CEP7S contains an electronic circuit board that is self powered. If connected as shown in Fig. 3, the CEP7S circuit board will not power up and the CEP7S would not trip.

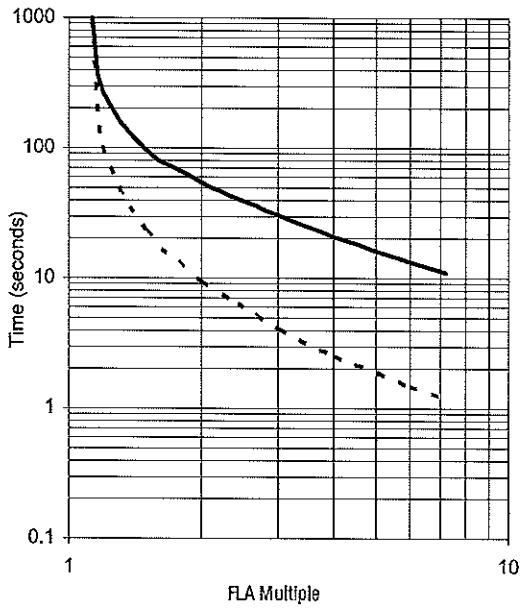
Technical Information

Trip Curves ❶

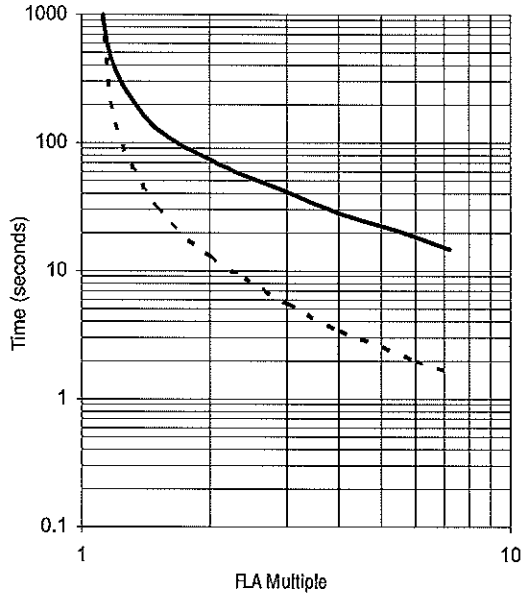
Trip Class 10



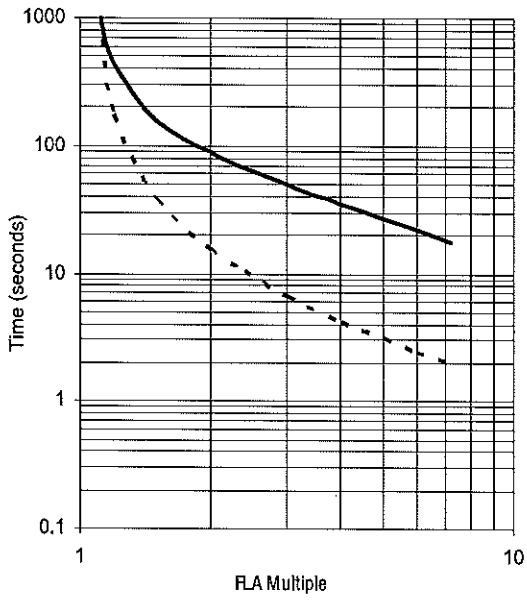
Trip Class 15



Trip Class 20



Trip Class 30



Trip Curve Legend

Cold Trip ——————

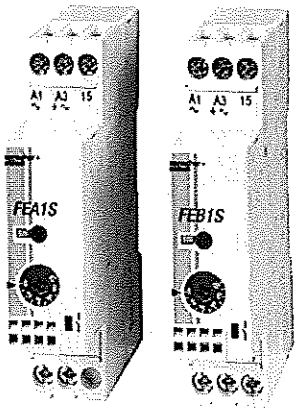
Hot Trip - - - - -

❶ Typical reset time for CEP7 Second Generation devices set to "automatic reset" mode is 120 seconds.

RZ7-FE Electronic Timing Relays

The economical choice for most industrial timing applications

Sprecher + Schuh's RZ7-FE electronic timing relays offer seven popular output functions in an economical package. This series is especially designed for applications where a high quality, yet basic timing relay is required. Timing formats include ON-delay, OFF-delay, Wye-Delta and four other choices. All models are multi-time relays, meaning that various time ranges (from 0.05 seconds to 10 hours) can be selected from the face of the relay.



Solid state accuracy and reliability

Except for their hard silver contacts, all RZ7-FE timing relays are built with solid state surface mounted electronics and are accurate to within one percent. Their ruggedness and accuracy is due to the thorough testing of function, timing characteristics and surge voltage strength performed on *each device* prior to shipment.

In addition, RZ7-FE relays function reliably from 15% under rated operating voltage to 10% over rated operating voltage (AC). Voltage tolerance is even greater in DC applications.

Universal voltage capability

All RZ7-FE timing relays operate with multiple supply voltages ranging from 24VAC or DC to 240VAC. Universal voltage capability means smaller inventories and more flexibility.

Choose from two different output contacts

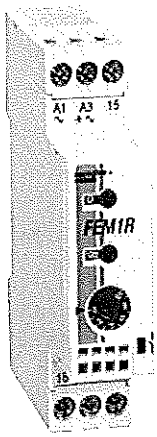
New to the RZ7-FE series is the choice between one normally open (NO) contact or one single pole double throw (SPDT) contact. The new SPDT version can be used either normally open or normally closed. This version has several technical advantages such as shorter impulse duration requirements and a faster recovery time.

Multiple functions in one relay

The RZ7-FEM relay combines four of the most popular timing functions into one device. Six timing ranges are included that are individually selectable from 0.05 seconds to 10 hours. This multifunction relay reduces inventories and is ideal for maintaining remote installations where stocking several different timing relays would not be practical.

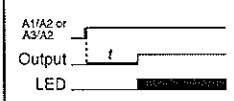
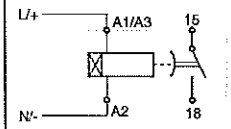
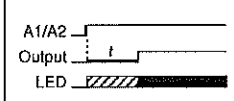
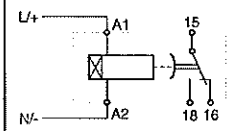
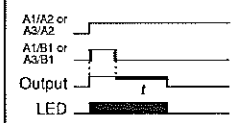
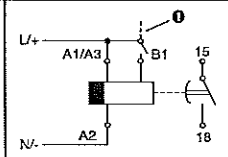
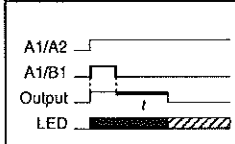
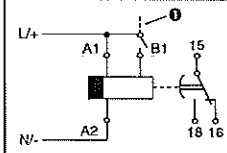
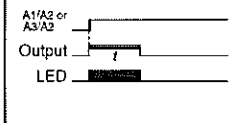
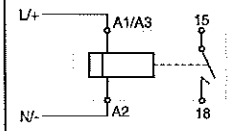
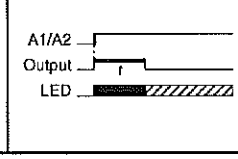
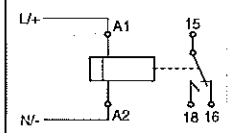
Many safety and convenience features

- Each relay is equipped with an LED that indicates output status conditions.
- Finger and back of hand protection to IP40.
- Terminals are captive and supplied in the open position.
- All RZ7's can be surface mounted, rail mounted, or mounted directly on our family of CA7/CS7 or CA4/CS4 devices.
- RZ7 relays can be mounted in any plane.
- Terminals, setting knob and LED's are all accessible from the front of the unit.
- RZ7-FE Timing Relays are very compact, measuring approximately 1" x 3" x 3".



The RZ7-FEM multifunction timing relay combines all functions in one device.

RZ7-FE Timing Relays – Single Function, One Pole

Functional Description	Functional Diagram	Terminal Arrangement	Type	Catalog Number	Price
ON-Delay Timing Relay (A) When supply voltage is applied, output contact(s) change state after time delay *t*.			• One NO contact • Multi-timing range (from 0.75s to 1h) ❷ • Supply voltage selected via wiring terminals A1, A2 or A3 • LED indicator	**RZ7-FEA1SU22**	50
			• One SPDT contact • Multi-timing range (from 0.05s to 10h) ❷ • "Universal" terminals accept all appropriate supply voltages • Bi-color LED indicator	**RZ7-FEA3TU23**	54
OFF-Delay Timing Relay (B) When control contact B1 closes, the output contact changes state immediately. When control contact B1 opens, the output contact changes state after time delay *t*. Constant supply voltage required on terminals A1/A2 or A3/A2. ***Note:** Control pulse duration minimum 250ms for RZ7-FEB1SU22; 50ms (AC) and 30ms (DC) for RZ7-FEB3TU23.*			• One NO contact • Multi-timing range (from 0.75s to 1h) ❷ • Supply voltage selected via wiring terminals A1, A2 or A3 • LED indicator	**RZ7-FEB1SU22**	54
			• One SPDT contact • Multi-timing range (from 0.05s to 10h) ❷ • "Universal" terminals accept all appropriate supply voltages • Bi-color LED indicator	**RZ7-FEB3TU23**	58
One Shot Relay / Watchdog (D) When supply voltage is applied, the output contact changes state for time period *t*.			• One NO contact • Multi-timing range (from 0.75s to 1h) ❷ • Supply voltage selected via wiring terminals A1, A2 or A3 • LED indicator	**RZ7-FED1SU22**	50
			• One SPDT contact • Multi-timing range (from 0.05s to 10h) ❷ • "Universal" terminals accept all appropriate supply voltages • Bi-color LED indicator	**RZ7-FED3TU23**	54

Supply Voltage

The last three digits in the catalog number represent the supply voltage range the relay will accept:

U22	24V AC or DC	(A3/A2)
	110...240V 50/60Hz	(A1/A2)
U23	24...48VDC and 24...240V 50/60Hz	(A1/A2)

Bi-Color LED

Relays with SPDT contacts have bi-color LEDs to indicate function:

▨	LED = green	Supply voltage available
■	LED = red	Output is energized

Timing Ranges	
RZ7-FE with NO contact	**RZ7-FE with SPDT contact**
(15s) 0.75...15 sec (1mn) 0.05...1 min (8mn) 0.4...8 min (1h) 0.05...1 hour	(1s) 0.05...1 sec (10s) 0.5...10 sec (1mn) 0.05...1 min (10mn) 0.5...10 min (1h) 0.05...1 hour (10h) 0.5...10 hours

RZ7-FE timing relay

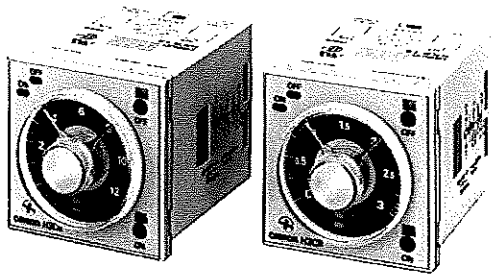
❶ For timing control, a voltage other than the supply voltage can also be used.
❷ Timing range is screwdriver selectable from the faceplate.

OMRON®

Solid-State Repeat-Cycle Timer

H3CR-F

1/16 DIN Solid-State Repeat-Cycle Timer



- Wide power supply ranges of 100 to 240 VAC 24 VAC/VDC, 12VDC
- Combinations of independent long or short ON/OFF time settings are possible
- Fourteen time ranges from 0.05 s to 30 h or 1.2 s to 300 h
- Repeat cycle models with either ON start or OFF start operating functions
- Easy sequence checks through instantaneous outputs for a zero set value at any time range
- 11-pin and 8-pin models are available

Ordering Information

Part number					
	Repeat cycle OFF start	H3CR-F	H3CR-F8	H3CR-F-300	H3CR-F8-300
	Repeat cycle ON start	H3CR-FN	H3CR-F8N	H3CR-FN-300	H3CR-F8N-300
Timing units		0.05 s to 30 h		1.2 s to 300 h	
Terminal form		11-pin models	8-pin models	11-pin models	8-pin models
Supply voltages		100 to 240 VAC, 24 VAC/DC, 12 VDC			
Operating mode		Repeat cycle			

Note: Specify both the model number and supply voltage when ordering.
Example: H3CR-F 24 VAC/DC
└── Supply voltage

■ MODEL NUMBER LEGEND

H3CR - □ □ □ -□
1 2 3 4

1. Classification
F: Repeat cycle timers

2. Configuration
None: 11-pin socket
8: 8-pin socket

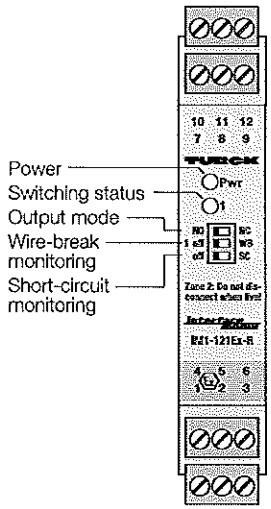
3. Repeat cycle mode
None: OFF start
N: ON start

4. Specified Type
300: Long time range (1.2 s to 300 h) type

Specifications

Part number		H3CR-F/-F-300	H3CR-F8/-F8-300	H3CR-FN/-FN-300	H3CR-F8N/-F8N-300
Operating mode		OFF start		ON start	
Supply voltage (see note)	AC	100 to 240 VAC (50/60 Hz)			
	AC/DC	24 VAC/DC (50/60 Hz)			
	DC	12 VDC			
Operating voltage range		85% to 110% of rated supply voltage, 90% to 110% with 12-VDC models			
Power consumption	AC	100 to 240 VAC: 10 VA (100 VAC applied)			
	AC/DC	24 VAC/DC: 2 VA (24 VAC applied)/1 W (24 VDC applied)			
	DC	12 VDC: 1 W			
Start, Reset, Gate inputs		ON-impedance: 1 kΩ max. ON residual voltage: 1 V max OFF impedance: 500 kΩ min.			
Control outputs	Type	DPDT relay			
	Max. load	5 A at 250 VAC, p.f. = 1			
	Min. load	10mA at 5 VDC			
Repeat accuracy		±0.3% full scale max. (±0.3% full scale max. ±10 ms in ranges of 1.2 and 3 s)			
Setting error		±5% full scale max ±0.05 s max.			
Resetting system		Time-limit operation/time-limit reset or self-reset			
Resetting time		Minimum power-opening time: 0.1 sec			
Indicators		Output ON indicator (orange LED), output OFF indicator (green LED)			
Materials		Plastic case (light gray Munsell 5Y7/1)			
Mounting		Panel, DIN track, or surface depending on socket selected			
Connections		11-pin round socket	8-pin round socket	11-pin round socket	8-pin round socket
Weight		Approx. 100 g (4.23 oz.)			
Approvals		UL, CSA, CE			
Ambient temperature	Operating	-10° to 55°C (14° to 131°F) with no icing			
	Storage	-25° to 65°C (-13° to 149°F) with no icing			
Humidity		35% to 85%			
Vibration	Mechanical durability	10 to 55 Hz with 0.75-mm single amplitude each in three directions			
	Malfunction durability	10 to 55 Hz with 0.5-mm single amplitude each in three directions			
Shock	Mechanical durability	980 m/s^2 (100G) each in three directions			
	Malfunction durability	98 m/s^2 (10G) each in three directions			
Variation due to voltage change		±0.5% full scale max. (±0.5% full scale max. ±10 ms in ranges of 1.2 and 3 s)			
Variation due to temperature change		±2% full scale max. (±2% full scale max. ±10 ms in ranges of 1.2 and 3 s)			
Service life	Mechanical	20 million operations min. (under no load at 1,800 operations/h)			
	Electrical	100,000 operations min. (5 A at 250 VAC, resistive load at 1,800 operations/h)			
Insulation resistance		100 MΩ min. (at 500 VDC)			

Note: A power supply with a ripple of 20% max. (single-phase power supply with full-wave rectification) can be used with each DC model.



Isolating switching amplifier IM1-121Ex-R 1-channel

- **1-channel isolating switching amplifier with removeable terminal blocks**
- **Intrinsically safe input circuit EEx ia**
- **Area of application acc. to ATEX: II (1) GD, II 3 G**
- **Approved for installation in zone 2, however the device must be installed in a housing which complies with the requirements of EN 60079-15 with a minimum protection degree of IP54**
- **Functional safety up to SIL 2 (acc. to EN 61508)**
- **Input circuit monitoring for wire-break and short-circuit (can be disabled)**
- **Galvanic isolation between input circuit, output circuits and power supply**
- **2 relay outputs, each with one NO contact, one of the outputs assigned for alarm signals**
- **Selectable NO/NC output function**
- **Universal supply voltage (20...250 VAC/20...125 VDC)**

The isolating switching amplifier type IM1-121Ex-R is a single channel device featuring an intrinsically safe input circuit.

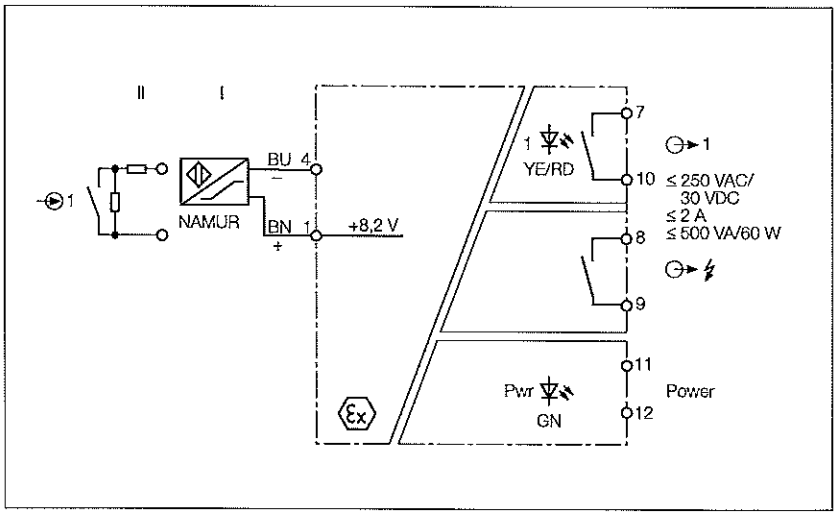
It can be connected to sensors according to EN 60947-5-6 (NAMUR), variable resistors or potential-free contacts.

The output circuits feature two relays each with one NO contact; one of the relays is assigned as an alarm output.

Three front panel programming switches select the output function (normally open mode = NO or normally closed mode = NC) and enable separate activation and de-activation of wire-break (WB) and short-circuit (SC) monitoring.

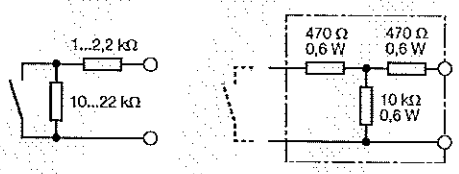
When using mechanical contacts as the input device, wire-break and short-circuit monitoring must be disabled or shunt resistors must be connected to the contacts (II). (See next page for contact configuration).

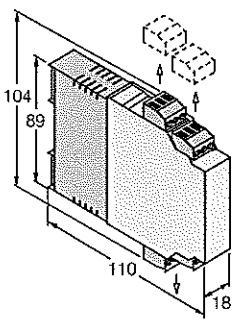
The green LED on the front cover indicates that the device is powered. The dual colour LED indicates the switching status (yellow) as well as fault conditions (red). When the input circuit monitoring feature is activated, red illuminates to indicate a fault in the input circuit and the output and alarm relay are de-energised.



interface modul

Isolating switching amplifier IM1-121Ex-R

Type	IM1-121Ex-R
Ident-no.	7541229
Supply voltage U_B	20...250 VAC/20...125 VDC
Line frequency (AC)	40...70 Hz
Power/current consumption	≤ 3 W
Galvanic isolation	between input circuit, output circuits and supply voltage for 250 V_{rms}, test voltage 2.5 kV_{rms}
Input Circuit	according to EN 60947-5-6 (NAMUR), intrinsically safe according to EN 50020
Operating characteristics	
– Voltage	8.2 V
– Current	8.2 mA
Switching threshold	1.55 mA
Hysteresis	typ. 0.2 mA
Wire-break threshold	≤ 0.1 mA
Short-circuit threshold	≥ 6 mA
Contact Configuration	
Of mechanical switches with active input circuit monitoring function	 resistor module WM1, ident-no. 0912101
Output Circuits	2 relay outputs with 1 NO contact each
Switching voltage	≤ 250 VAC/120 VDC
Switching current per output	≤ 2 A
Switching capacity per output	≤ 500 VA/60 W
Switching frequency	≤ 10 Hz
Contact material	silver-alloy + 3 µm Au
Ex-Approval acc. to certificate of conformity	TÜV 04 ATEX 2553 / TÜV 06 ATEX 552968 X
Maximum nominal values	
– No load voltage U_0	≤ 9.6 V
– Short-circuit current I_0	≤ 11 mA
– Power P_0	≤ 26 mW
Maximum external inductances/capacitances	
– [EEx ia] IIC	1 mH/1.1 µF / 5 mH/0.83 µF / 10 mH/0.74 µF
– [EEx ia] IIB	2 mH/5,2 µF / 10 mH/3,8 µF / 20 mH/3,4 µF
– Ex nL IIC	1 mH/1,9 µF / 5 mH/1,4 µF / 10 mH/1,2 µF
– Ex nL IIB	1 mH/11 µF / 5 mH/7,5 µF / 10 mH/6,6 µF
Marking of devices	⟨Ex⟩ II (1) GD [EEx ia] IIC II 3 G Ex nA nC [nL] IIC/IIB T4
LED Indications	
– Power	green
– Switching status/fault indication	1 x yellow/red (dual colour LED)
Terminal Housing	12-pole, 18 mm wide, Polycarbonate/ABS, flammability class V-0 per UL 94
Mounting	snap-on clamps for top-hat rail (DIN 50022) or screw terminals for panel mounting
Connection	removeable terminal blocks, reverse-polarity protected, screw connection, self-lifting
Connection profile	≤ 1 x 2.5 mm², 2 x 1.5 mm² or 2 x 1.0 mm² with wire sleeves
Degree of protection (IEC 60529/EN 60529)	IP20
Operating temperature	-25...+70 °C

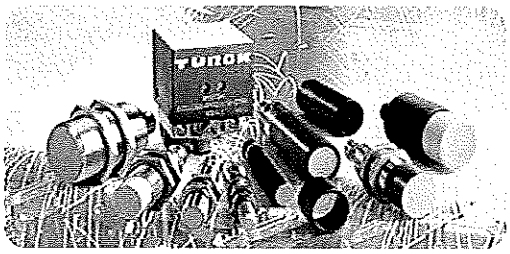


Hans Turck GmbH & Co.KG • D–45466 Mülheim/Ruhr • Tel. 0208/4952-0 • Fax 0208/4952-264 • E-Mail: more@turck.com • www.turck.com

TURCK

Industrial Automation

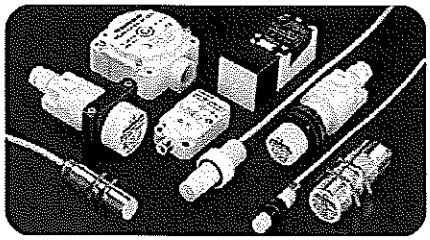
Proximity Sensors



weldguard®

- Resists high heat, weld slag build-up and abrasion
- Up to 500 times more durable than other sensors
- Embeddable or non-embeddable
- Available in weld-field immune ***Uprox***® and standard ferrite core versions
- ***armorguard***™ protection for sensors in impact-prone locations

Inductive Sensors



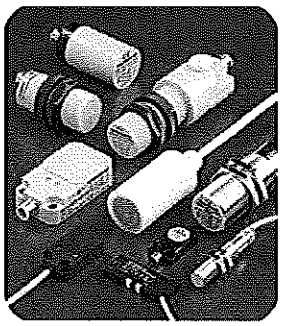
- ***amphibian***™ washdown versions
- High and low temperature
- Harsh duty (IP 67, 68, 69K)
- Die protection
- Ring and slot versions

Uprox+

- Detect all metal types extended sensing ranges
- Inherently weld-field immune
- Up to 350% more range than conventional sensors
- Wide -30°C (-22°F) to +85°C (+185°F) temperature range

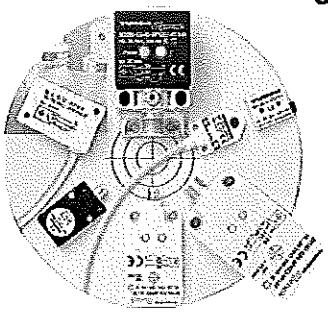
picoprox®

- Tiny 3, 4, 5, 6.5 and 8 mm diameter stainless steel housings
- Extended sensing range up to 4 mm



Capacitive Sensors

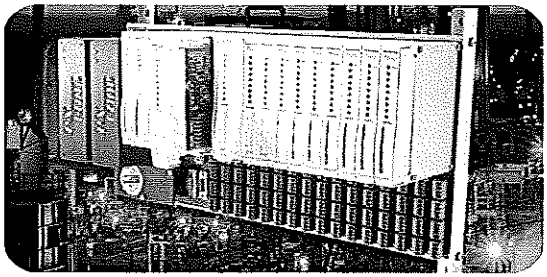
- Non-contact sensing of metallic and non-metallic materials
- Ideal for level detection
- Available in DC, AC and IS models
- Solid-state output, high switching frequency, no moving parts



Q-pak®

- Compact size fits in confined areas where other sensors can't
  - Superior 3 mm (0.01") to 50 mm (0.20") range
  - Models from 5 mm to 80 mm size with embeddable versions.

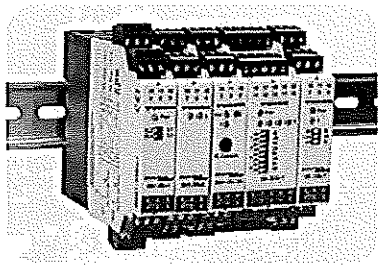
Intrinsically Safe Systems



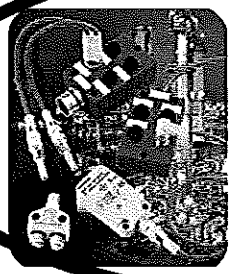
excom® Remote I/O for Hazardous Areas

- Eliminate need for conventional IS barriers
- Modular backplane bus with integrated voltage supply for 18, 9 or 5 modules
- Modules can be exchanged "hot swapped" during operation

multimodul® IS Barriers

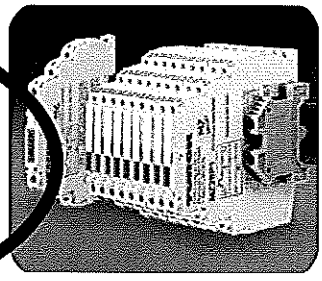


- Complete line features isolated design with no need for dedicated ground
- Hazardous circuits are galvanically isolated from non-hazardous circuits
- DIN-rail or Eurocard styles
- FM, CSA and CENELEC certified



NAMUR Sensors and Junctions

- Class I, Class II, Class III, Division 1 and Division 2 FM approved
- Full line of inductive, capacitive and magnet operated inductive sensors
- Numerous sizes and styles are available
- Eliminates multiple cable runs for wiring IS applications

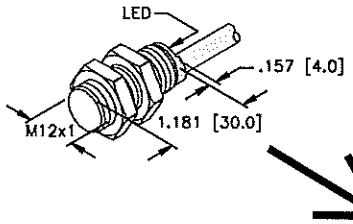
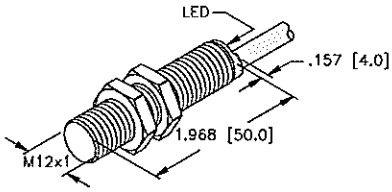
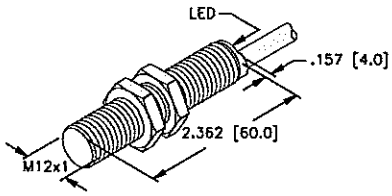
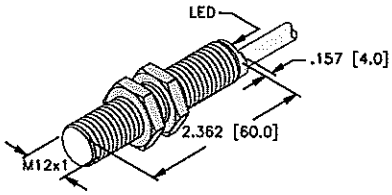


ZENER Barriers

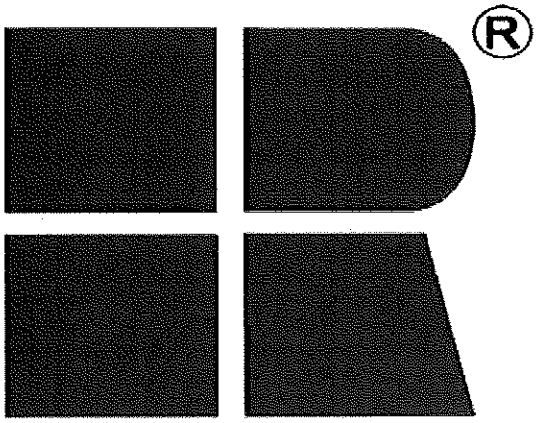
- FM, CSA, BASEEFA/ CENELEC certified
- Shunt-diode intrinsic safety barriers feature narrow 7 mm width
- Meet worldwide standards for use in classified atmospheres

TURCK Inc. 3000 Campus Drive, Minneapolis, MN 55441 Application Support: 1-800-544-7769 Fax: (763) 553-0708 www.turck.com

Inductive Sensors

Housing Style	Part Number	ID Number	Features	Sensing Range (mm)	Output
12 mm - Embeddable, Potted-In Cable 	Bi 3-GT12K-AD4X/S1610	T4405083-2	*armorguard*	3	2-Wire DC
	Bi 2-EG12HK-AN6X/S1589	T4605192	*armorguard*	2	3-Wire DC NPN
	Bi 2-G12K-AN6X	T4671200	*Short Barrel*	2	
	Bi 4-G12K-AN6X	T4670251	*Short Barrel*	4	
	Bi 2-G12K-AP6X	T4670200	*Short Barrel*	2	3-Wire DC PNP
	Bi 4-G12K-AP6X	T4670250	*Short Barrel*	4	
	Bi 2-EG12-YOX	T4012000		2	2-Wire DC NAMUR
	Bi 2-G12-YO	T1005400		2	
	Bi 2-G12-YOX	T4010000		2	
12 mm - Embeddable, Potted-In Cable 	Bi 2-EG12-AN6X	T4605101		2	3-Wire DC NPN
	Bi 2-G12-AN6X	T4635500		2	
	Bi 2-G12-AN7X	T4730500	*TTL Compatible*	2	
	Bi 4-G12-AN6X	T1690706	*Extended Range*	4	
	Bi 2-EG12-AP6X	T4605001		2	3-Wire DC PNP
	Bi 2-G12-AP6X	T4635400		2	
12 mm - Embeddable, Potted-In Cable 	Bi 2-G12-ADZ32X	T4205000		2	2-Wire AC/DC Short-circuit Protected
	Bi 4-G12-ADZ32X	T4205030	*Extended Range*	4	
	Bi 2-G12-AZ33X	T1304002		2	2-Wire AC/DC
12 mm - Embeddable, Potted-In Cable, Teflon Coated 	Bi 2-GT12-ADZ32X/S34	T4205210	*WFI*	2	2-Wire AC/DC Short-circuit Protected
	Bi 2-GT12-AZ33X/S34	T1304052	*WFI*	2	2-Wire AC/DC

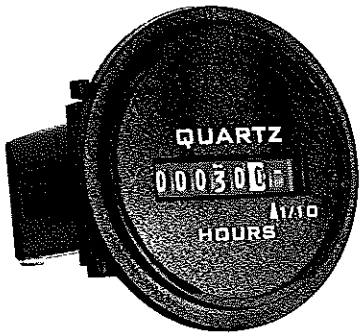
For detailed sensor specifications see Section M.
Normally Closed versions available upon request, consult factory.

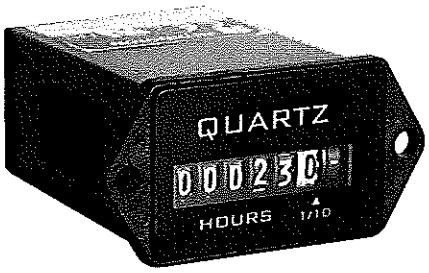


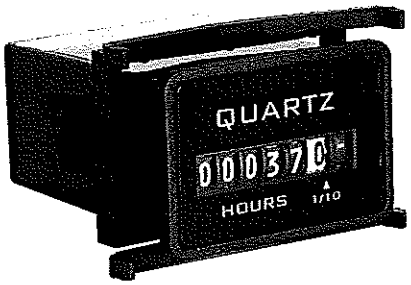
REDINGTON

What the world is counting on.

Phone: (860) 688-6205 www.redingtoncounters.com Fax: (860) 688-1591







Description

The Redington Model 722 provides an AC Hour Meter with an operating range of 90-264VAC 50/60 Hz. You no longer require two separate meters, one for 115VAC and one for 230VAC. Models are available in the standard industry housings, 2-Hole Rectangular, Flush-Rectangular, Flush-Round and 3-Hole Round. Its quartz time base insures accurate long-term time keeping. The Totally Sealed case protects against the environment and provides years of reliable service. All models are NEMA 4X, 12 rated when mounted with optional gasket.

Features

- Operating voltage 90-264VAC 50/60Hz
- Totally Sealed
- UL/cUL Recognized, CE & RoHS Compliant
- 6 Figure, 99999.9
- Quartz accuracy

Options

- Wire leads
- Gasket kit (for NEMA 4X, 12 rating)
- Custom lens
- Terminals up, down, straight

Specifications

Figures:	6 - digits, 0.14" [3.6mm] 99999.9 Hours and idicator - white on black Decimal - black on white
Reset:	Non-reset
Voltage:	90-264VAC
Frequency:	50/60Hz
Power:	1 watt max.
Mounting:	Clip or mounting holes
Termination:	¼" [6.3mm] spade terminals
Weight:	~2 oz [57 g]
Accuracy:	± 0.02% over entire range

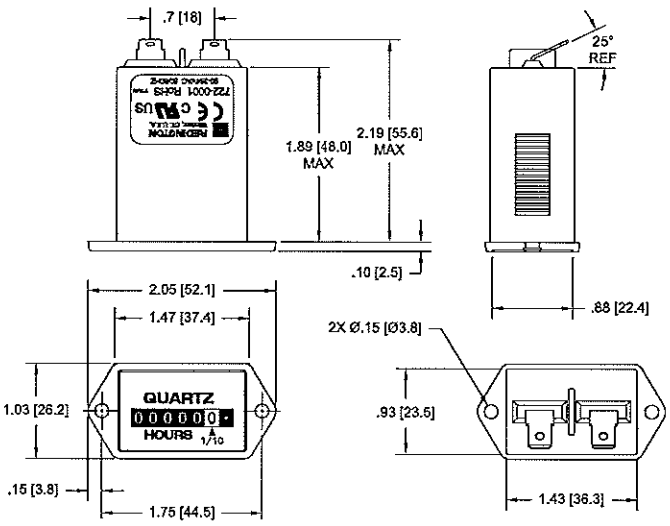
Case Material:	Black polymer
Lens Material:	Polymer
Agency Approvals:	UL/cUL Recognized, CE & RoHS Compliant, SAE & NEMA 4X, 12 Compliant
Environmental:	Totally Sealed
Front Panel:	NEMA 4X, 12 rated with optional gasket
Temperature:	-40°F to +185°F [-40°C to + 85°C]
Humidity:	95% (SAE J1378)
Vibration:	10-80 Hz. 20g max. (SAE J1378)
Shock:	55g @ 9 - 13msec (SAE J1378)

Models	Description
722-0001	2-Hole Rectangular, 90-264VAC 50/60Hz, ¼" [6.3mm] spade terminals, hours & 1/10's
722-0002	Flush-Rectangular, 90-264VAC 50/60Hz, ¼" [6.3mm] spade terminals, hours & 1/10's
722-0003	Flush-Round, 90-264VAC 50/60Hz, ¼" [6.3mm] spade terminals, hours & 1/10's
722-0004	3-Hole Round, 90-264VAC 50/60Hz, ¼" [6.3mm] spade terminals, hours & 1/10's
5003-009	NEMA 4X, 12 Gasket for Model 722-0002
5003-010	NEMA 4X, 12 Gasket for Model 722-0001
5003-011	NEMA 4X, 12 Gasket for Model 722-0004
5003-012	NEMA 4X, 12 Gasket for Model 722-0003

* All items are normally in factory stock

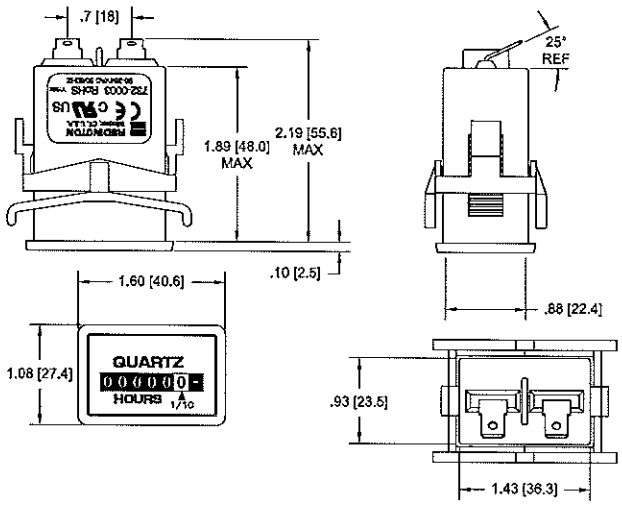
Dimensions

2-Hole



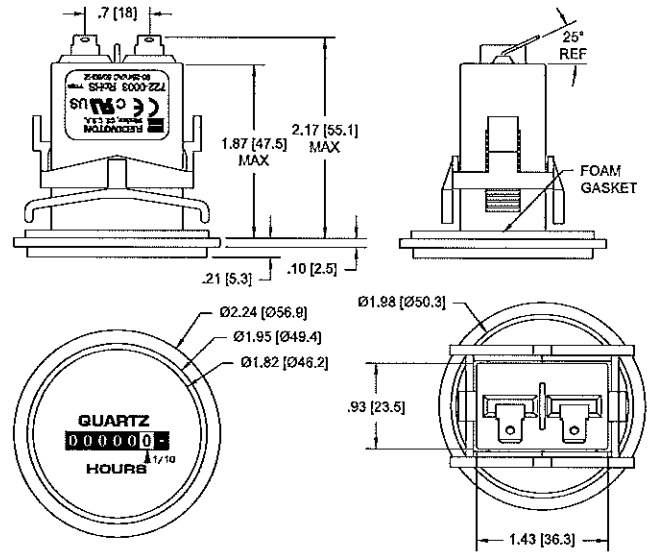
Panel Opening: 1.45" X 0.95" [36.8 X 24.1]

Flush-Rectangular



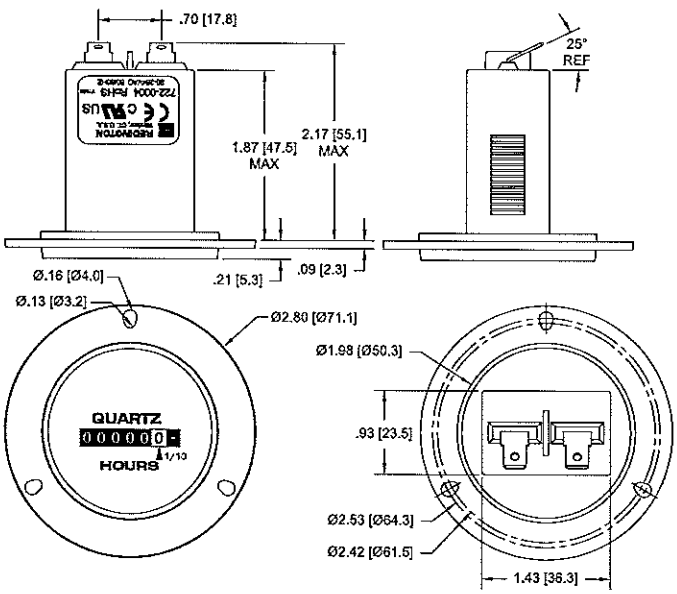
Panel Opening: 1.45" X 0.95" [36.8 X 24.1]
Panel Thickness: 0.03 to 0.63 [0.76 to 16.00]

Flush-Round



Panel Opening: 2.0" [50.6]
Panel Thickness: 0.40 [10.2] Max.

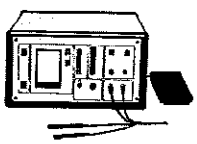
3-Hole Round



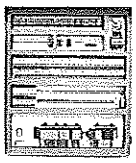
Panel Opening: 2.0" [50.6]

Applications

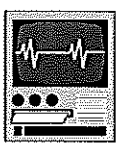
Medical Equipment



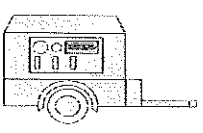
Control Panels



Test Equipment



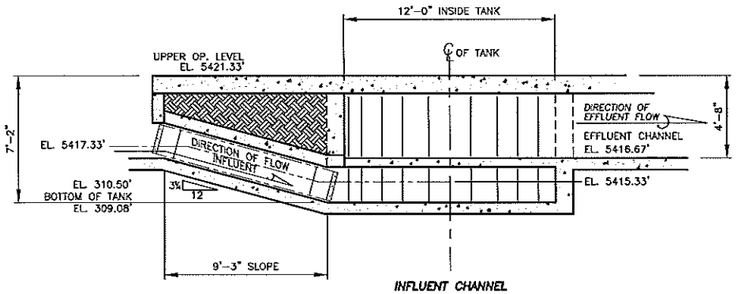
Generators



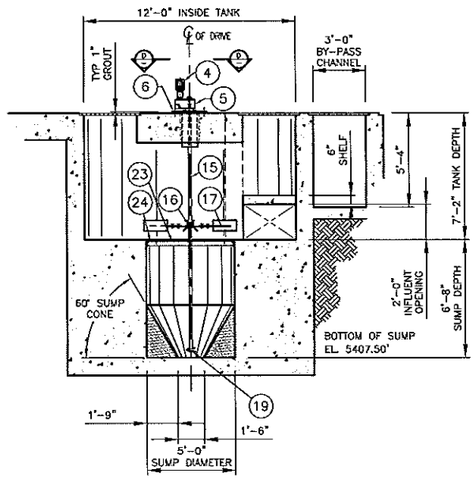
Office Equipment

SECTION V

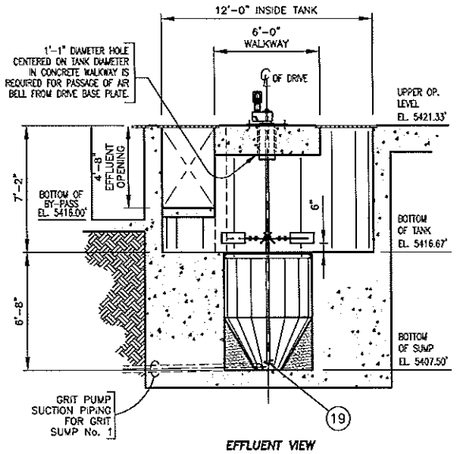
GENERAL & ELECTRICAL SHOP DRAWINGS



INFLUENT CHANNEL
SECTION A–A

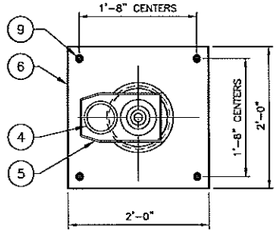


INFLUENT VIEW
SECTION B–B
VIEW ROTATED 90° – CW

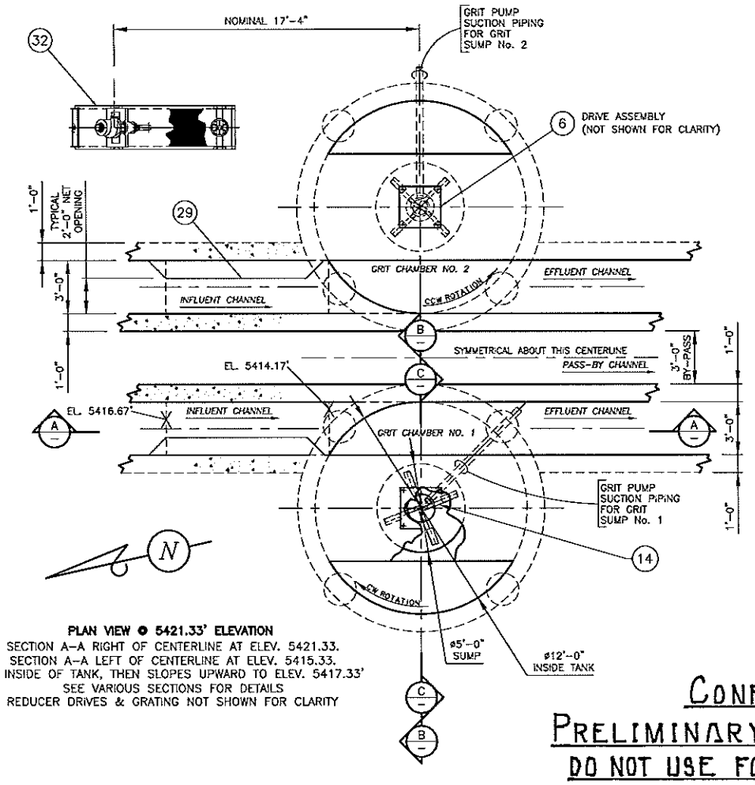


EFFLUENT VIEW
SECTION C–C
VIEW ROTATED 90° – CCW

REFER TO PLAN VIEW FOR ACTUAL PIPING ORIENTATION OF PUMP SUCTION EMBEDDED PURGE PIPING



VIEW D–D
ENLARGED 4x VIEW FOR CLARITY



PLAN VIEW @ 5421.33' ELEVATION
SECTION A–A RIGHT OF CENTERLINE AT ELEV. 5421.33.
SECTION A–A LEFT OF CENTERLINE AT ELEV. 5415.33.
TO INSIDE OF TANK, THEN SLOPES UPWARD TO ELEV. 5417.33'
SEE VARIOUS SECTIONS FOR DETAILS
REDUCER DRIVES & GRATING NOT SHOWN FOR CLARITY

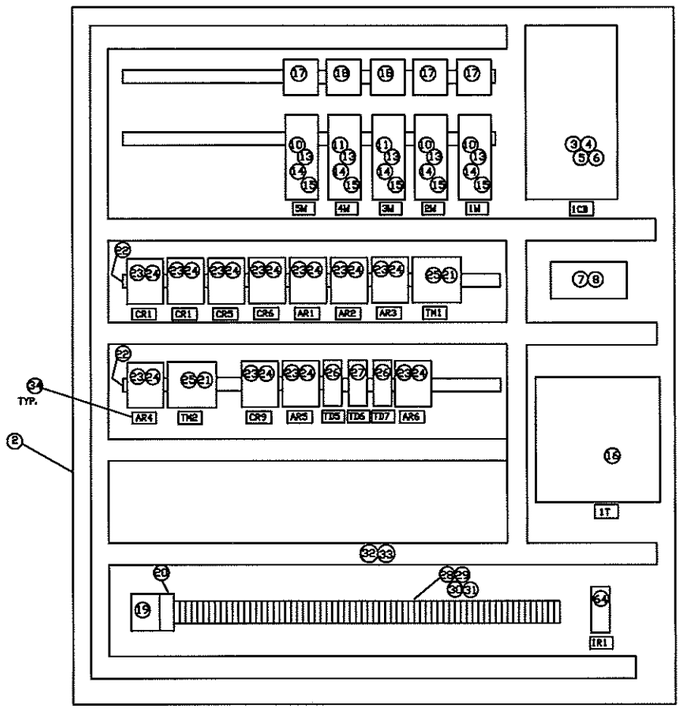
IDENTIFICATION GROUP	IDENTIFICATION PIECE	QUAN.	SPECIFICATION DWG OR PART NO.	SPECIFICATION NAME, DESCRIPTION, MATERIAL	REFERENCE	SYMBOL
	1	TWO		FORCED VORTEX GRIT COLLECTOR (1) CW AND (1) CCW		
				EACH CONSISTING OF THE FOLLOWING:		
	3	ONE	.03	DRIVE ASSEMBLY		
	4	1		MOTOR, 1.5 HP, 1800 RPM, 230/460V-60-3, XP		
	5	1		SPEED REDUCER		
	6	1		DRIVE BASE WITH AIR BELL	CARBON STEEL	
	7	1		TUBE, CAULK	SILICONE	
	8	LOT		ASSEMBLY FASTENER	STAINLESS STEEL	
	9	4		EPOXY ANCHOR, 5/8" X 6" LG (BY OTHERS) ⬅	18-8 SST	
	14	ONE	.02	IMPELLER ASSEMBLY, NOMINAL 60" DIA		
	15	1	NOTE 8	SHAFT	C1045	
	16	1		IMPELLER HUB	HRS	
	17	1	NOTE 8	ADJUSTABLE IMPELLER BLADE	HRS	
	18	LOT		ASSEMBLY FASTENER	18-8 SST	
	19	1	NOTE 8	GRIT LIFT VANE	HRS	
	22	ONE	.03	GRIT CHAMBER FLOOR PLATE ASSEMBLY		
	23	1		FLOOR PLATE, 1/2" THICK (2-PIECE)	HRS	
	24	1		SUPPORT BEAM	HRS	
	25	2		SUPPORT BRACKETS	HRS	
	26	LOT		ASSEMBLY FASTENERS	18-8 SST	
	27	12		EPOXY ANCHOR BOLT, 1/2" X 7" (BY OTHERS) ⬅	18-8 SST	
	29	ONE		INLET BAFFLE	HRS	
	30	6		EPOXY ANCHOR, 1/2" X 7" (BY OTHERS) ⬅	18-8 SST	
	32	ONE		12 SW GRIT WASHER – REF TO SEE DWG. 1757-11-C1		
	34	TWO		GRIT PUMP		
	35			ELECTRICAL CONTROL, PER SCHLOSS DWGS A2 & A3		
	37			OPERATION AND MAINTENANCE MANUALS		
	39	LOT		SPARE PARTS and/or ACCESSORIES		
	40	1 SET		SEALS AND GASKETS FOR REDUCER		
	42	1 SET		REPLACEMENT BEARINGS FOR SPEED REDUCER		

GENERAL NOTES:

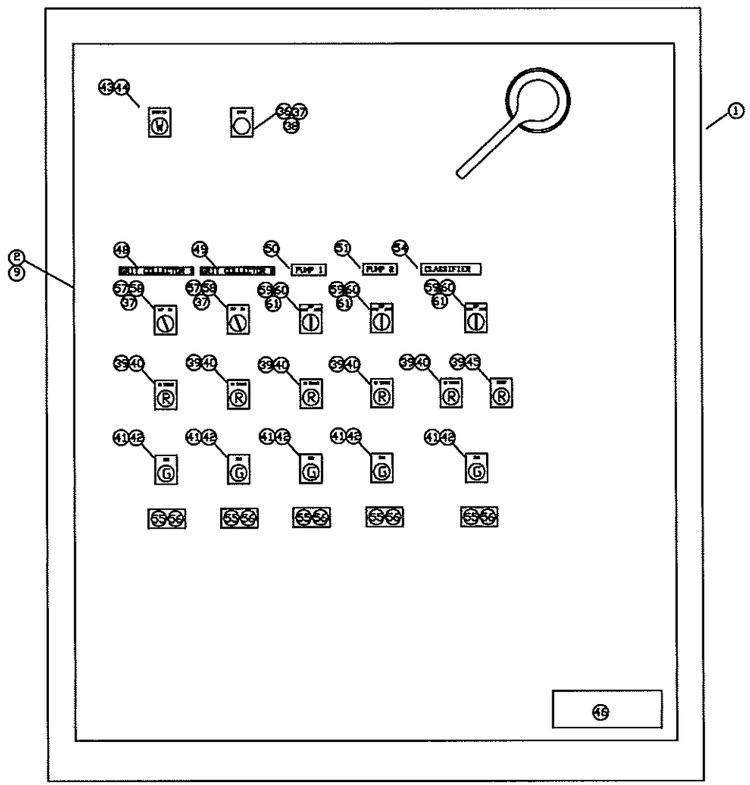
1. SURFACE PREPARATION, PAINTING AND PROTECTIVE COATINGS
   A. FABRICATED STEEL–NON IMMERSION: COMMERCIAL BLAST CLEAN SSPC-SP6 FOR SYSTEM 66-1 TNEMEC PAINT
      PRIME COAT: 66-1211 3.0-5.0 MILS DFT
      FINISH COAT: BY OTHERS
   B. FABRICATED STEEL, IMMERSION: COMMERCIAL BLAST CLEAN SSPC-SP10 FOR SYSTEM 66-1 TNEMEC PAINT
      PRIME COAT: 66-1211 3.0-5.0 MILS DFT
      FINISH COAT: BY OTHERS
   C. ITEMS NOT TO BE PAINTED: GALVANIZED STEEL, STAINLESS STEEL, MACHINED SURFACES, FINISHED ITEMS
   D. MACHINED SURFACES SHALL BE COATED WITH PROTECTIVE FILM OR GREASE AS DETERMINED BY SERVICE
2. GROUTING OF EQUIPMENT TO BE DONE ONLY AFTER ALIGNMENT IS COMPLETED AND TEST RUN IS PERFORMED.
3. EQUIPMENT LABOR AND MATERIALS FURNISHED BY OTHERS UNLESS OTHERWISE SPECIFIED (I.E. NOT BY SCHLOSS ENGINEERED EQUIP.) UNLOADING, INSTALLATION & ERECTION, PIPING & WIRING, GROUT & GROUTING, MOTOR STARTERS & CONTROLS, SAFETY GUARDS OTHER THAN THOSE PROVIDED, ACCESS PLATFORMS & LADDERS AND ALL WARNING SIGNS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   "DO NOT PUT HANDS OR TOOLS IN MOVING MACHINERY" AND
   "CAUTION THIS MACHINE CONTROLLED AUTOMATICALLY AND MAY START ANYTIME."
4. ALL LUBRICANTS TO BE FURNISHED BY OTHERS TO SUIT LOCAL CONDITIONS PER INSTALLATION INSTRUCTIONS.
5. THIS DRAWING IS THE PROPERTY OF SCHLOSS ENGINEERED EQUIPMENT, INC. USE OF THIS DRAWING OR ANY INFORMATION THEREON FOR OTHER THAN ITS INTENDED PURPOSE IS EXPRESSLY PROHIBITED.
6. CAUTION: THIS EQUIPMENT MUST BE ASSEMBLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE SERVICE INSTRUCTIONS. FAILURE TO DO SO MAY RESULT IN SERIOUS PERSONAL INJURY AND/OR PROPERTY DAMAGE. ADDITIONAL COPIES OF THE SERVICE INSTRUCTIONS ARE AVAILABLE FROM SCHLOSS ENGINEERED EQUIPMENT, INC.
7. PIPING AND ALL SUPPORTS BY OTHERS. REFER TO PLAN VIEW FOR PREFERRED ORIENTATION OF GRIT PUMP SUCTION AND WATER PURGE LINE. FINAL ORIENTATION BY OTHERS.
8. THE PITCH OF THE GRIT LIFT VANE MUST BE THE SAME PITCH DIRECTION AS THE PITCH DIRECTION OF TURBINE BLADES. THE PITCH DIRECTION FOR BOTH THE TURBINE BLADES AND THE GRIT LIFT VANE MUST LIFT THE GRIT IN AN UPWARD DIRECTION.

CONFIDENTIAL
PRELIMINARY-FOR APPROVAL ONLY
DO NOT USE FOR CONSTRUCTION

TITLE	TYPE: (2) 12 CPT FORCED VORTEX GRIT COLLECTOR		
	12'-0" DIAMETER		
	GENERAL ARRANGEMENT AND ASSEMBLY		
	FOR: HAROLD D. THOMPSON RWRF, FOUNTAIN, CO	4	
	ENGINEER: CMS, INC., COLORADO SPRINGS, CO	REV.	DATE / DESCRIPTION OF REVISION
DRAWN	GTW	CHECKED	APPROVED CMS
DATE	7/11/11	SCHLOSS ENGINEERED EQUIPMENT, INC. AURORA, COLORADO	REFERENCE 1757-11-A1
SCALE	1/4"=1'-0"		

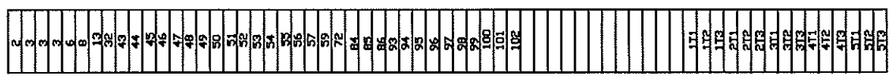


REAR SUB-PANEL



PANEL DOOR

TERMINAL DETAIL



MATERIAL LIST

ITEM	QTY	DESCRIPTION	MANUFACTURER	PART NUMBER
1	1	ENCLOSURE, NEMA 4/12/13, 48x36x12	SAGINAW	SCE-48X3612LP
2	1	SUB-PANEL, 45x33	SAGINAW	SCE-48P36
3	1	CIRCUIT BREAKER, 600V, 45A, 25KAIC	ABB	S3N6045TV
4	1	CB OPERATOR, NEMA 4/4X	ABB	K5VD-H
5	1	CB HANDLE, NEMA 4/4X	ABB	OHB95L10
6	1	CB OPERATOR SHAFT	ABB	OXF10X22S
7	1	POWER DIST. BLOCK, 3P, 6/COND	FERRAZ	07536
8	3	POWER DIST. BLOCK SAFETY COVER	FERRAZ	08570
9		NOT USED		
10	3	NON-REV CONTACTOR, 9A, 120V	S+S	CA7-9-10-120
11	2	NON-REV CONTACTOR, 12A, 120V	S+S	CA7-12-10-120
12	3	SS OVERLOAD RELAY, 1.0-5.0A	S+S	CEP7-EE08
13	2	SS OVERLOAD RELAY, 3.8-16A	S+S	CEP7-EE08
14	5	JAM PROTECTION REMOTE RESET MODULE	S+S	CEP7-EJM
15	5	AUX. CONTACTS, 2ND, TOP MTD.	S+S	CA7-PV-20
16	1	TRANSFORMER, 208/230/460,PRI 240/115V SEC., 500VA.	MICRON	B500-2008-8F
17	3	MIN. CIRCUIT BREAKER, 3P, 460V, 4A	ABB	S203-K4
18	2	MIN. CIRCUIT BREAKER, 3P, 460V, 20A	ABB	S203-K20
19	1	MIN. CIRCUIT BREAKER, 2P, 460V, 2A	ABB	S202-K2
20	1	MIN. CIRCUIT BREAKER, 1P, 460V, 5A	ABB	S201-K5
21	2	SOCKET, 8 PIN	IDEC	SR2P-06
22	1	DIN MOUNTING RAIL	IDEC	BAP1000
23	11	CONTROL RELAY, 4PDT	IDEC	RH4B-U-AC120V
24	11	SOCKET, 4 POLE	IDEC	SH4B-05
25	2	REPEAT CYCLE TIMER, 8 PIN	OMRON	H3CR-F8-AC120
26	2	OFF TIME DELAY RELAY	S+S	K27-FE83TU23
27	1	ON TIME DELAY RELAY	S+S	K27-FEA3TU23
28	50	TERMINAL BLOCK, 600V, 50A, 6MM	SQUARE D	9080V635U
29	2	TERMINAL END COVER	SQUARE D	AB1AC6
30	4	TERMINAL END BRACKET	SQUARE D	AB1AB8H35
31	6	MARKING STRIP, BLANK, 1 CARD, WHITE, 8MM	WIELAND	24.242.6053.0
32	2	WIRING DUCT, 1"Wx3"hx6'L	PANDUIT	E1X3LG6
33	2	WIRE DUCT COVER, 1"Wx6'L	PANDUIT	C1LG6
34#	26	NAMEPLATE, 1/2"H x 1/4"LETTERS, 1EA *1CR*,*1M*,*2M*,*3M*,*4M*,*5M* *1T*,*AR1*,*AR2*,*AR3*,*AR4*,*AR5* *AR6*,*CR1*,*CR2*,*CR5*,*CR6* *CR9*,*TD2*,*TD4*,*TD5*,*TD6*, *TD7*,*TN1*,*TN2*,*1R1*		
35		NOT USED		
36	1	22MM PB OPERATOR, BLACK	SQUARE D	XB4BA21
37	3	22MM MOUNTING BASE, W/ 1NC-1NC	SQUARE D	ZB4BZ105
38	1	22MM, LEGEND PLATE, 'RESET'	SQUARE D	ZBY2332
39	6	22MM, ILL PB, RED LED 115V, 1NO,1NC	SQUARE D	XB4BV34G5
40M	5	22MM, LEGEND PLATE, 'HIGH TORQUE'	SQUARE D	ZBY2101
41	5	PILOT LIGHT, 120VAC, LED, PRES-TEST, GRE	SQUARE D	9001-SKT38LGG31
42	5	22MM, LEGEND PLATE, 'RUN'	SQUARE D	ZB4BY2334
43	1	22MM, PILOT LIGHT, WHITE, LED, 115VAC	SQUARE D	XB4BVG1
44	1	22MM, LEGEND PLATE, 'POWER ON'	SQUARE D	ZBY2336
45	1	22MM, LEGEND PLATE, 'FAULT'	SQUARE D	ZBY2101
46#	1	NAMEPLATE, 1 3/4"Wx8"Hx1/4 LETTERS *GRIT SYSTEM* *SERIAL NO. 1757-11* *SCHLOSS ENGINEERED EQUIPMENT, INC.*		
47	5	NEMA 7,1 HOLE,'PULL START/PUSH STOP'	AKRON	CX1333-X1-B7-N6
48#	1	NAMEPLATE 1/2"Hx1 1/8"Wx1/4 LETTERS	GRIT COLLECTOR 1'	
49#	1	NAMEPLATE 1/2"Hx1 1/8"Wx1/4 LETTERS	GRIT COLLECTOR 2'	
50#	1	NAMEPLATE 1/2"Hx1 1/8"Wx1/4 LETTERS	'PUMP 1'	
51#	1	NAMEPLATE 1/2"Hx1 1/8"Wx1/4 LETTERS	'PUMP 2'	
52#		NOT USED		
53#		NOT USED		
54#	1	NAMEPLATE 1/2"Hx1 1/8"Wx1/4 LETTERS	'CLASSIFIER'	
55	5	ELAPSED TIME METER, NEMA 1B	REDDINGTON	722-0004
56	5	ELAPSED TIME METER, NEMA 4X GASKET	REDDINGTON	5003-11
57	2	22MM, 2 POS MAINTAINED SEL. SWITCH	SQUARE D	ZB4BJ2
58	2	LEGEND PLATE, 'OFF ON'	SQUARE D	9001-KN1448P
59	3	22MM, 3 POSITION MAINTAINED SEL. SW	SQUARE D	ZB4BJ3
60	3	22MM, MTG BASE, W/ 2 NO CONTACTS	SQUARE D	ZB4BZ1034
61	3	22MM, LEGEND PLATE, 'HAND-OFF-AUTO'	SQUARE D	ZBY2387
62	5	PUSH-PULL PADLOCKING COVER	ALLEN-BRADLEY	800H-NP4
63		NOT USED		
64	1	INTRINSICALLY SAFE RELAY	TURCK	MK1-121Ex-R
65	1	NAMUR PROXIMITY SENSOR	TURCK	BI 2-EG12-YOX
#		CUSTOM ENGRAVED LEGEND PLATE PER MANUFACTURER'S SPECIFICATIONS		
@		ALL NAMEPLATES TO BE BLACK LAMINATED PLASTIC WITH WHITE LETTERS		

GENERAL NOTES

1. ALL CONTROL WIRING TO BE 14GA STRANDED WITH WIRE NUMBERS EACH END.
2. " □" DENOTES TERMINALS, '- - -' DENOTES EXTERNAL WIRING, AND " ○" DENOTES TERMINALS ON DEVICES NOTED.
3. CONTROL PANEL WIRING TO BE COMPLETELY TESTED AND ALL CORRECTIONS MADE PRIOR TO SHIPMENT. PANEL FABRICATOR TO RETURN ONE (1) PRINT FOR EACH DRAWING WITH 'AS-BUILT' MARK-UPS ALONG WITH COMPONENT INSTRUCTIONS TO SCHLOSS ENGINEERED EQUIPMENT, INC.

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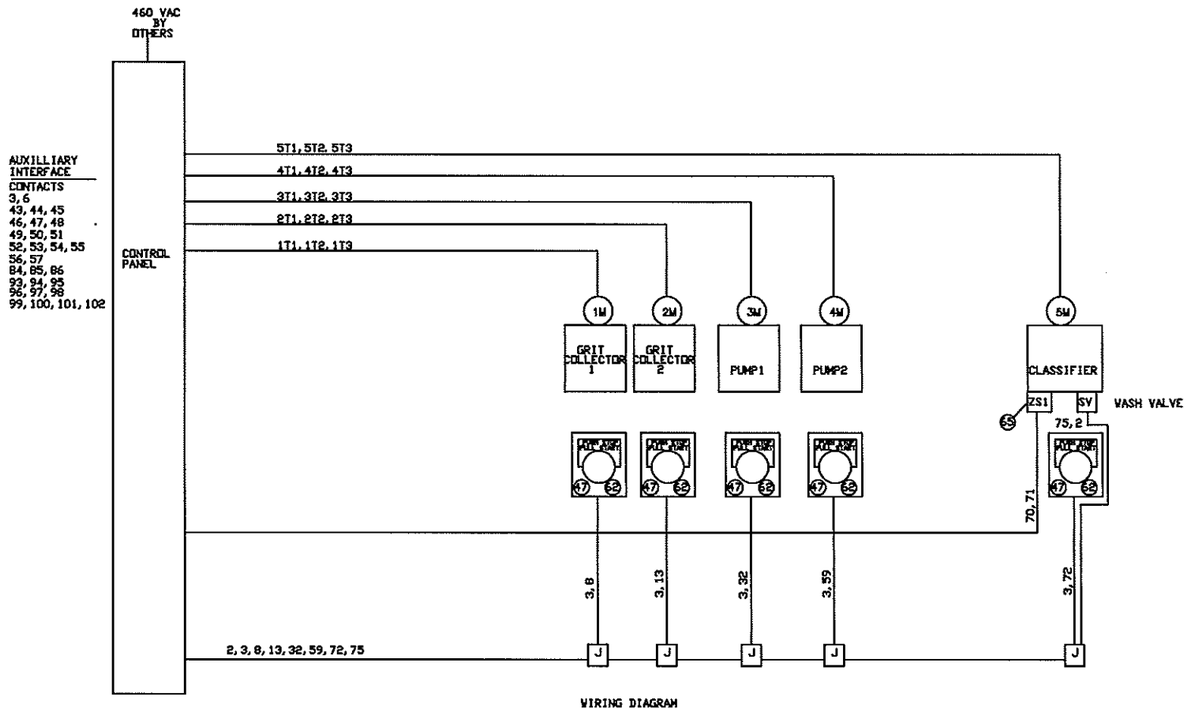
TITLE	GRIT SYSTEM		
	FOUNTAIN, CO		
	ELECTRICAL CONTROL SYSTEM SHT. 1 OF 4		
FILE: 1757A2		REV.	DATE / DESCRIPTION OF REVISION
DRAWN: JT	CHECKED / APPROVED	REFERENCE	
DATE: 8/5/11	SCHLOSS ENGINEERED EQUIPMENT, INC. AURORA, COLORADO	1757-11-A2	
SCALE: NTS			



WIRING DIAGRAM

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TITLE: GRIT SYSTEM			
FOUNTAIN, CO			
ELECTRICAL CONTROL SYSTEM SHT. 2 OF 4			
FILE: 1757A3	REV.	DATE	DESCRIPTION OF REVISION
DRAWN: JT	CHECKED	APPROVED	REFERENCE
DATE: 8/5/11	SCHLOSS ENGINEERED EQUIPMENT, INC. AURORA, COLORADO		1757-11-A3
SCALE: NTS			

460VAC BY OTHERS

A L1
B L2
C L3

1CB 45A

CB2 LL3 LL1 2A 1T

CB3 3A CB3

1MCP, 4A — 1L1 1L2 1L3 — 1M — 1T1 1T2 1T3 — GRIT COLLECTOR 1, 1.5 HP DRIVE MOTOR, 2.6 FLA

2MCP, 4A — 2L1 2L2 2L3 — 2M — 2T1 2T3 2T13 — GRIT COLLECTOR 2, 1.5 HP DRIVE MOTOR, 2.6 FLA

3MCP, 20A — 3L1 3L2 3L3 — 3M — 3T1 3T2 3T3 — PUMP1, 7.5 HP DRIVE MOTOR, 10.8 FLA

4MCP, 20A — 4L1 4L2 4L3 — 4M — 4T1 4T2 4T3 — PUMP2, 7.5 HP DRIVE MOTOR, 10.8 FLA

5MCP, 4A — 5L1 5L2 5L3 — 5M — 5T1 5T2 5T3 — CLASSIFIER, 0.5 HP DRIVE MOTOR, 1.0 FLA

POWER ON

RESET

CR2 — 1-48, 2-125 OVERLOAD RESET 1-48

CR1

M1 OVERLOAD RESET — CR1 14 15
M2 OVERLOAD RESET — CR1 16 17
M3 OVERLOAD RESET — CR1 18 19
M4 OVERLOAD RESET — CR1 20 21
M5 OVERLOAD RESET — CR2 22 23

R1 R2 654321 A1 A2

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SCADA SHUTDOWN — 6 — CR6 2-208, CR5 1-112, 1-124, 1-134, 2-10

10L — 7 — AR1 — 1-153, 1-155
HI TORQUE A

PUSH STOP PULL START — CR5 8 9 — OFF ON — GRIT COLLECTOR 1 — 1M 10 — 10L — 1-01, 1-02, 1-03, 1-118, 1-150

1M 11 — RUN R — ETM

20L — 12 — AR2 — 1-153, 1-155
HI TORQUE A

PUSH STOP PULL START — CR5 13 24 — OFF ON — GRIT COLLECTOR 2 — 2MF 25 — 20L — 1-08, 1-09, 1-10, 1-129, 1-150

2M 26 — RUN R — ETM

30L — 34 — HI TORQUE A
AR3 — 1-153, 1-155

PUSH STOP PULL START — CR5 32 33 — OFF HAND AUTO 35 36

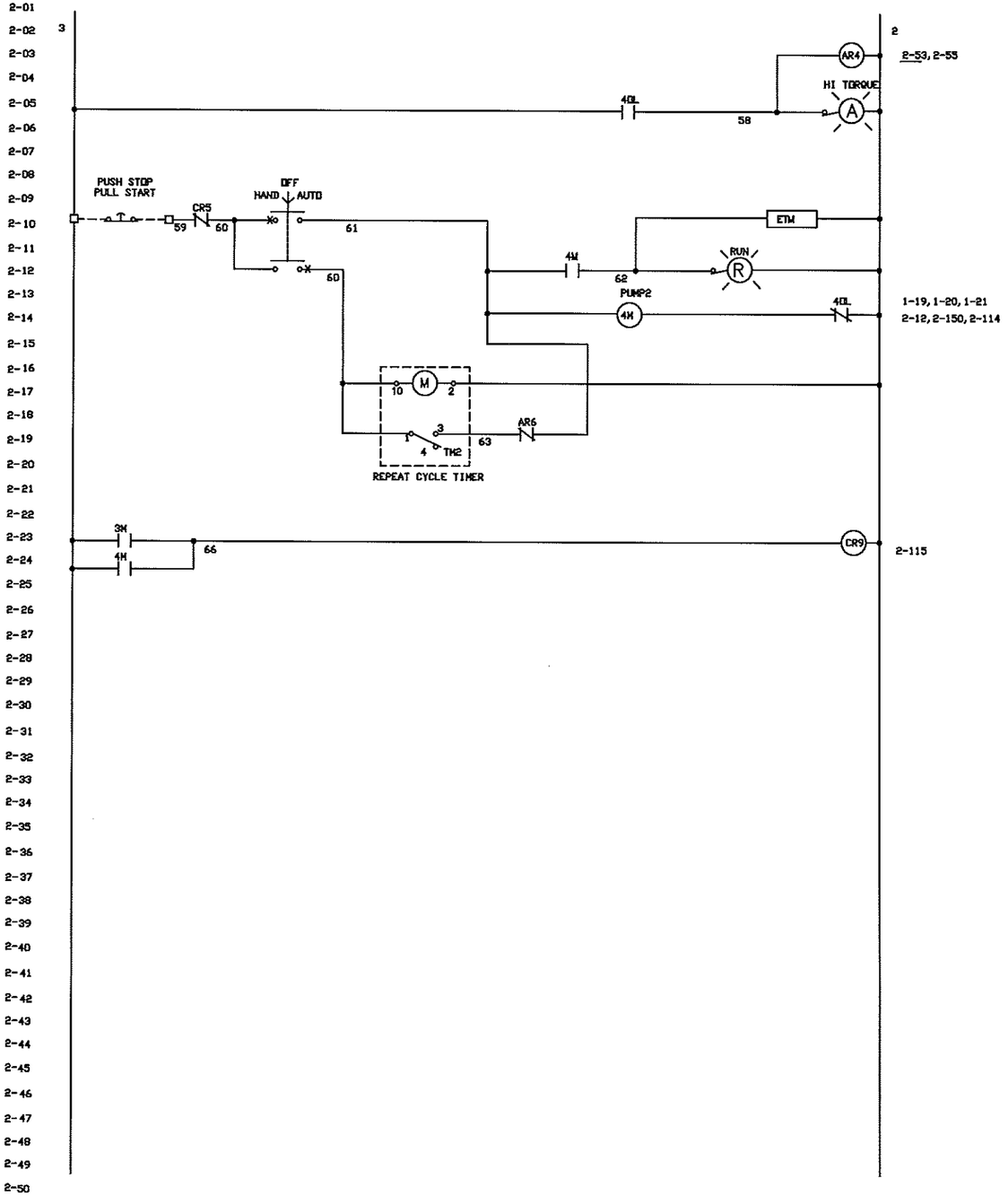
3M 37 — RUN R — ETM
PUMP1 3H — 30L — 1-15, 1-16, 1-17, 1-136, 2-113, 1-150

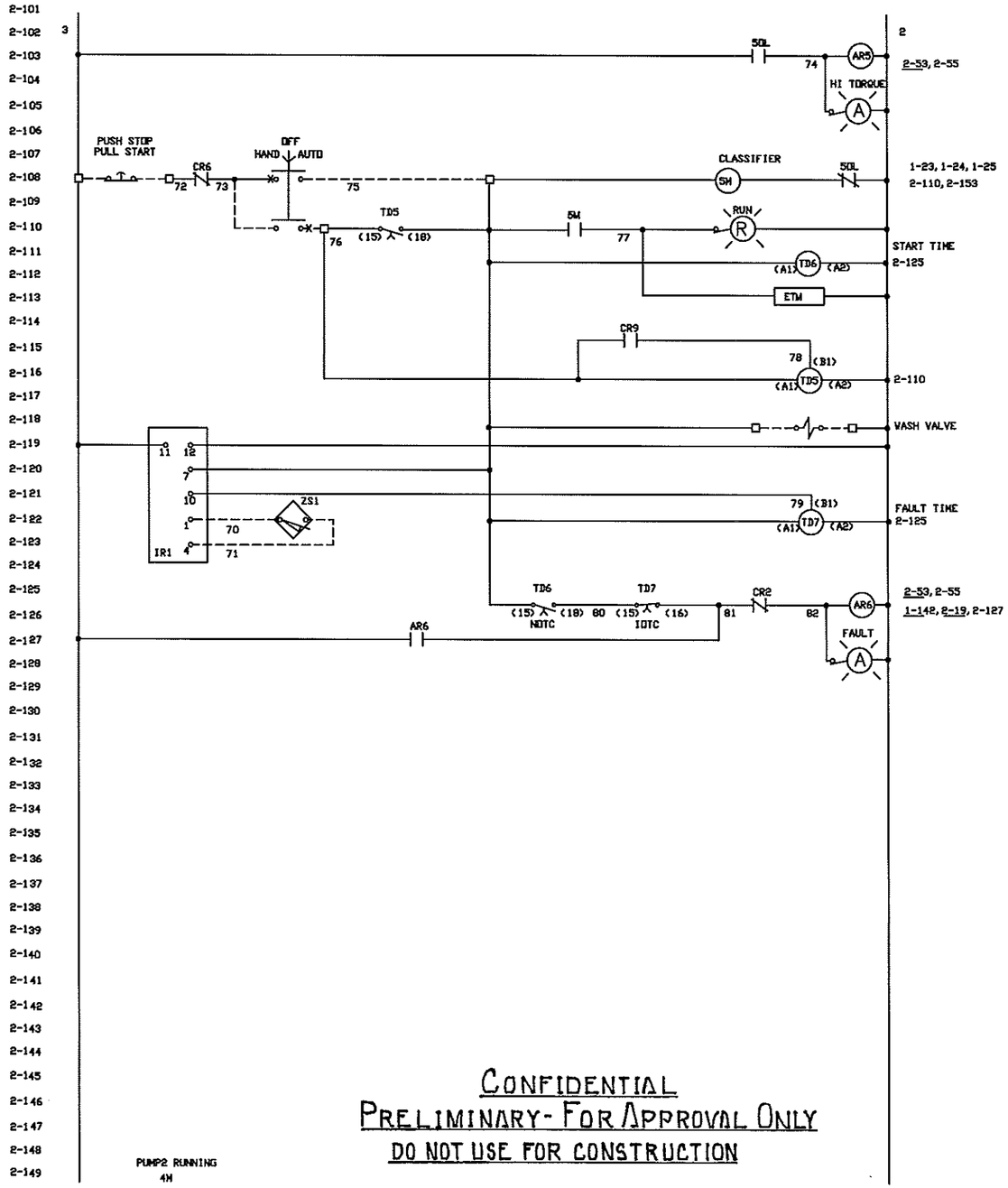
M 10 2 — TH1 1 3 4 — AR6 38
REPEAT CYCLE TIMER

GRIT COLLECTOR 1 RUNNING — 1M 52 53
GRIT COLLECTOR 2 RUNNING — 2M 54 55
PUMP 1 RUNNING — 3M 56 57

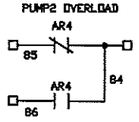
GRIT COLLECTOR 1 OVERLOAD — AR1 44 43 AR1 45
GRIT COLLECTOR 2 OVERLOAD — AR2 47 46 AR2 48
PUMP1 OVERLOAD — AR3 50 49 AR3 51

TITLE	GRIT SYSTEM FOUNTAIN, CO ELECTRICAL CONTROL SYSTEM SHT. 3 OF 4		
FILE	1757A4	REV.	DATE / DESCRIPTION OF REVISION
DRAWN	JT	CHECKED	APPROVED
DATE	7/15/11	SCHLOSS ENGINEERED EQUIPMENT, INC. AURORA, COLORADO	1757-11-A4
SCALE	NTS		

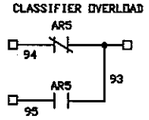




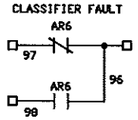
PUMP2 OVERLOAD



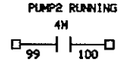
CLASSIFIER OVERLOAD



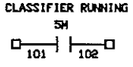
CLASSIFIER FAULT



PUMP2 RUNNING



CLASSIFIER RUNNING



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LAST WIRE NO. USED 102

TITLE GRIT SYSTEM			
FOUNTAIN, CO			
ELECTRICAL CONTROL SYSTEM SHT. 4 OF 4			
FILE: 1757A5	REV.	DATE	DESCRIPTION OF REVISION
DRAWN JT / CHECKED / APPROVED	REFERENCE		
DATE 8/5/11 / SCALE NTS	SCHLOSS ENGINEERED EQUIPMENT, INC. AURORA, COLORADO		1757-11-A5