

# SUBMITTAL TRANSMITAL

August 15, 2011 WGC Submittal No: 15800-002

- 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: Kuck Mechanical Contractors, LLC. 395 West 67<sup>th</sup> Street Loveland, CO 80593 970-461-3553 Melanie Peterson

SUBJECT: Fin Tubular Duct Heater - TAG: EDH-1

SPEC SECTION: 15800.2.4.B

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: 8/15/11 Reviewed by: H.C. Myers (X) Reviewed Without Comments () Reviewed With Comments	
ENGINEER'S COMMENTS:	



395 West 67th Street P.O. Box 388 Loveland, CO 80539-0388 Phone: (970) 461-3553 Fax: (970) 461-3443 SUBMITTAL

PAGE: 1 of 1

Fax: (970) 4	61-3443			
DATE:	08/10/11			
SENT TO:	Weaver General Contractors			
Attn:	John Jacob			
JOB:	Harold D. Thompson WRF (#01135)	SUBMITTAL NO.:	00005	
	СО	SUBMITTAL DUE: PACKAGE:	n/a	
VENDOR NA	ME: CFM	SPECIFICATION #	15800	
SUBJECT:	Fin Tubular Duct Heater			
<b>REVIEW DI</b>	ETAILS:			
Review #: Desc: Reviewer:	1 Fin Tubular Duct Heater John Jacob Weaver General Contractors	Received: 08/10/11 Sent: 08/10/11 Returned: Forwarded:	Priority: Status: Sepias: Prints:	Normal Open 0 0
Sent for t	he following action(s):			
✓ For Appr	oval 🗹 For Distribution	☐ For Your Use/File	es	☐ As Req'd per
Action N	eeded:			
Sincer Melani	ely, e Peterson			
PM As 395 W	lechanical Contractors sistant . 67th Street nd, CO 80538			



CFM COMPANY

AIR CONDITIONING / HEATING / VENTILATING EQUIPMENT 413D North Highway 287 - Ft. Collins, CO 80524 Phone: (970) 493-7293 / Fax: (970) 493-7297

# Harold Thompson WTP

# TAG: EDH-1

Fin Tubular Electric Duct Heater

Submittal Date: 7/28/2011

Submitted by: Eric Larsen

www.cfmcompany.com

# **ELECTRIC DUCT HEATERS CERTIFIED PRINTS**

#### Indeeco Sales Representative: 1440 S. Lipan St. Denver, co 80223 PHONE NO: 303-761-2291 FAX NO: FAX NO: ATTENTION: Ron White JOB NAME : Thompson Water Reclaim FILE: Thompson Water Reclaim.pch **REP. P.O. NUMBER: CUSTOMER P.O. NUMBER:** REFER TO ATTACHED SHEET FOR EXPLANATION INSIDE DUCT DIMENSIONS SUPPLY

lten No	1	QTY	HEATER TYPE	KW	1	ICHES HEIGHT	LINE VOLTS/ PHASE	STGS	CTRL VOLTS	CTRL OPTION	SPECIAL FEATURE CODE	FLOW	OVER HANG		
	1	1	TFXU	2.00	8.00	8.00	208/1	1	24	G	C,H3,L6,M4,Q,Q3,T2,U6,Z,Z2	U6	L6	1	Lucius success
	TOTAL	4													

TOTAL

Indeeco THERMOSTAT(S)	QTY	Item NO(s)
 Duct T'stat-Pilot Duty-1 Stg	1	1

#### Indeeco - 425 Hanley Industrial Court, St. Louis, MO, 63144, Phone (314) 644-4300, Fax (314) 644-5332, web http://www.Indeeco.com

## CUSTOMER

, N/A

PHONE NO:

**ATTENTION:** 

# ELECTRIC DUCT HEATERS CERTIFIED PRINTS

### CUSTOMER P.O. NUMBER:

APPROVALS - Any heater which contains a ""U"" in the ""HEATER TYPE"" column, is listed by Underwriters Laboratories (UL). Any heater which contains a ""C"" in this column, is listed by Canadian Standards Association (CSA)" MINIMUM AIR VELOCITY - This is the minimum uniform face air velocity (in feet per minute or meters per minute) required for proper operation of the heater at inlet temperatures up to and including 80 °F (27 ° C) if Application air velocities are less, contact your factory representative."

WIRING DIAGRAM - Wiring diagrams are typical and use numbered check blocks to fully detail the specific built-in controls for each heater." MINIMUM INCOMING WIRE GAUGE AND QUANTITY - Wire gauge (GA) is based upon the ampacities for 75 °C rated wire (90 °C for CSA listed heaters) in Table 310-16 of the NEC (Table 2 of CEC for CSA listed heaters.) Maximum wire ampacities are derated per NEC 424-3(b) and note 8 to Table 310-16 (Table 5C and 62-114(7) of the CEC for CSA listed heaters). When the load exceeds the capacity of 500 MCM wire, terminal blocks are furnished for two or more parallel conductors per phase. The number of such conductors is indicated under (QTY/PH) below. Aluminum conductors are not recommended and terminal blocks are not sized for aluminum wire. For heater/panel combination, the wire gauge shown on the heater line is for the heater to panel interconnecting wire. The wire gauge shown on the panel line is for the incoming power wiring."

			REF	ER TO I			NS IN IN G. ON AT		ED DRA	WING				MIN	WIRING DIAGRAM INCOMING			
Item No	w	Н	С	Μ	OL	OR	Ρ	D	E	F	G	N	FIG. NO	VEL AIR FPM''	NUMBER	CHECK BLOCKS	GA	VIRE QTY
1	8.00	8.00	6.00	30.00	23.25	0.75	10.00		4.50				1	325	930-2-1122-019-A-00	21, 24	14	1

# ELECTRIC FINNED TUBULAR DUCT HEATERS

#### HEATER TYPE

This print covers the following heater types: TFXU/TFXC Finned Tubular, Custom Slip-In TFZU/TFZC Finned Tubular, Custom, Flanged 831U/831C Remote Panel

Duct heaters utilize the finest construction principles and techniques. A coil of 80% nickel, 20% chromium resistance wire is precisely centered in a .475\" diameter stainless steel sheath. Magnesium oxide powder, compacted to rock-like density, insulates the coil electrically from the sheath. A 1-1/4\" O.D. spiral wound stainless steel fin makes a minimum of five passes per linear around the outside of the tubular element. The elements are furnished with mounting flanges, making them individually removable from the terminal box. The heater frame is constructed of heavy gauge corrosion resistant steel and is provided with generous flanges for structural rigidity. All heaters are suitable for installation in ducts with up to one inch of interior lining."

All heaters include thermal cutouts (not heat limiters or fusible links) in accordance with requirements of UL and CSA. All controls are factory-wired to clearly marked terminal blocks for field connections. Properly sized knockouts are provided. All heaters are supplied complete with wiring diagrams and installation instructions, and all are given a dielectric test at a minimum of 1200 volts before shipment.

#### AGENCY APPROVALS AND NATIONAL ELECTRICAL CODE

Duct heaters and panels with a "U" in the type designation are Listed by UL under Files E23192 and E53412 and those with a "C" are Certified under CSA master contract 151727. As such, they are suitable for installation with zero clearance to combustible surfaces and for use with heat pumps and central air conditioners. They are also supplied with all necessary provisions for installation in full accordance with the National Electric Code (NEC) and Canadian Electrical Code (CEC).

#### INSTALLATION

Slip-in duct heaters are installed by inserting through a rectangular opening cut in the side of the ductwork and are secured to the duct with sheet metal screws. To install flanged duct heaters, flanges must be provided on the duct to match the heater flanges, both on the entering and leaving air sides. The heater is secured to the ductwork by sheet metal screws or bolts through the mating flanges.

When the duct heater is being used in conjunction with an air conditioning or heat pump unit, it must be installed at least 48" from the unit. Sufficient working clearances must be provided on the terminal box side of the heater as detailed in the NEC and/or CEC. Care should be taken to follow all instructions found in the Installation, Operating and Maintenance Instructions sheet supplied with each heater.

#### SPECIAL FEATURES

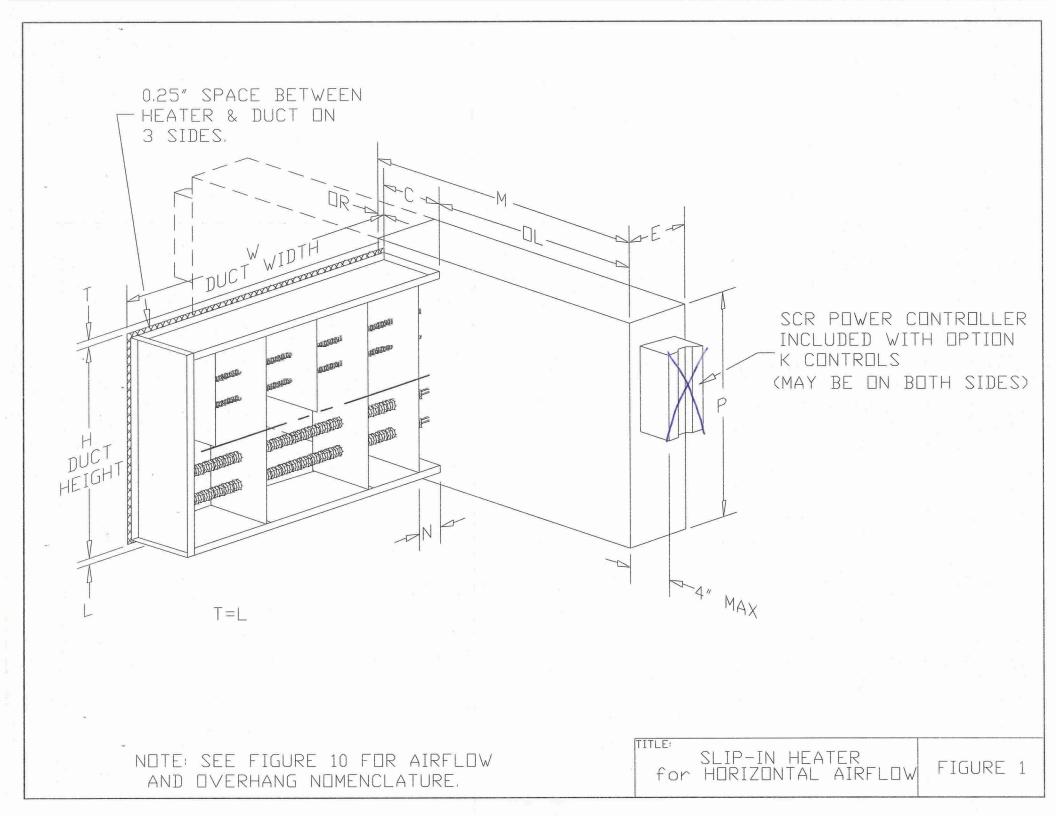
Heaters are available with a wide variety of special features and constructions. Your quotation or certified print includes a column for special feature codes. The codes in this column, as defined by the table below, describes details of both the standard control options, as well as any special features on the heater in question.": $\Box$ 

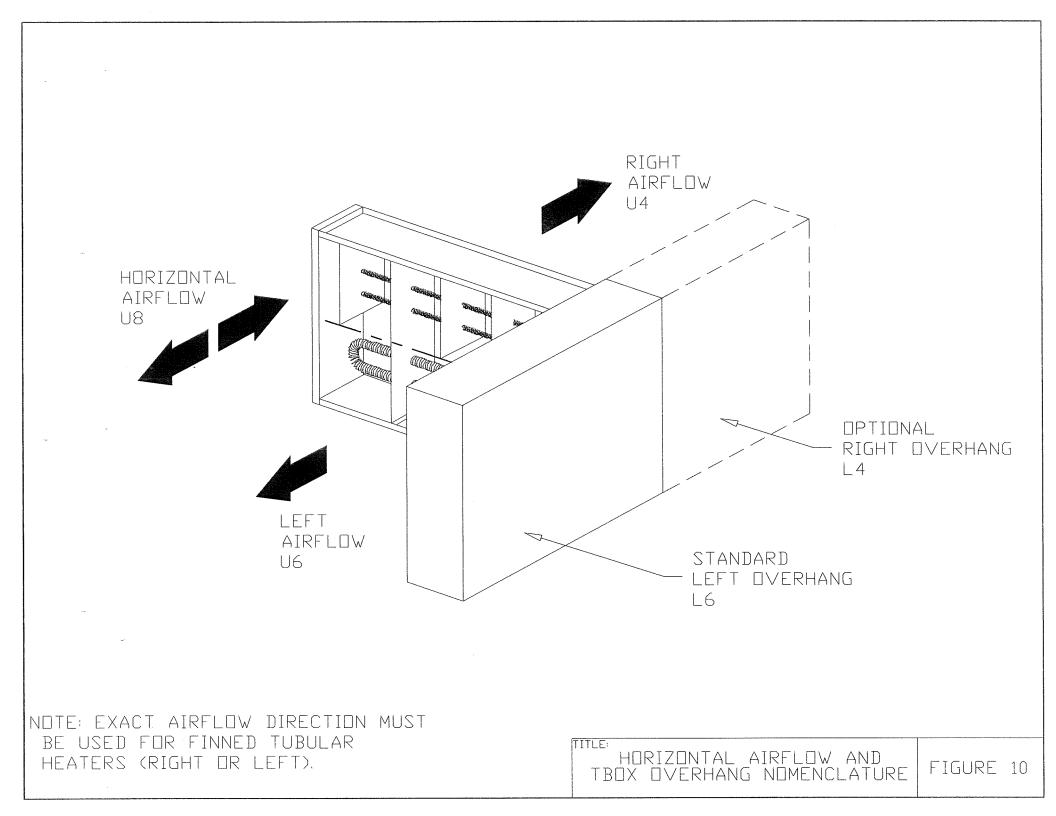
#### SPECIAL FEATURE CODE DEFINITIONS

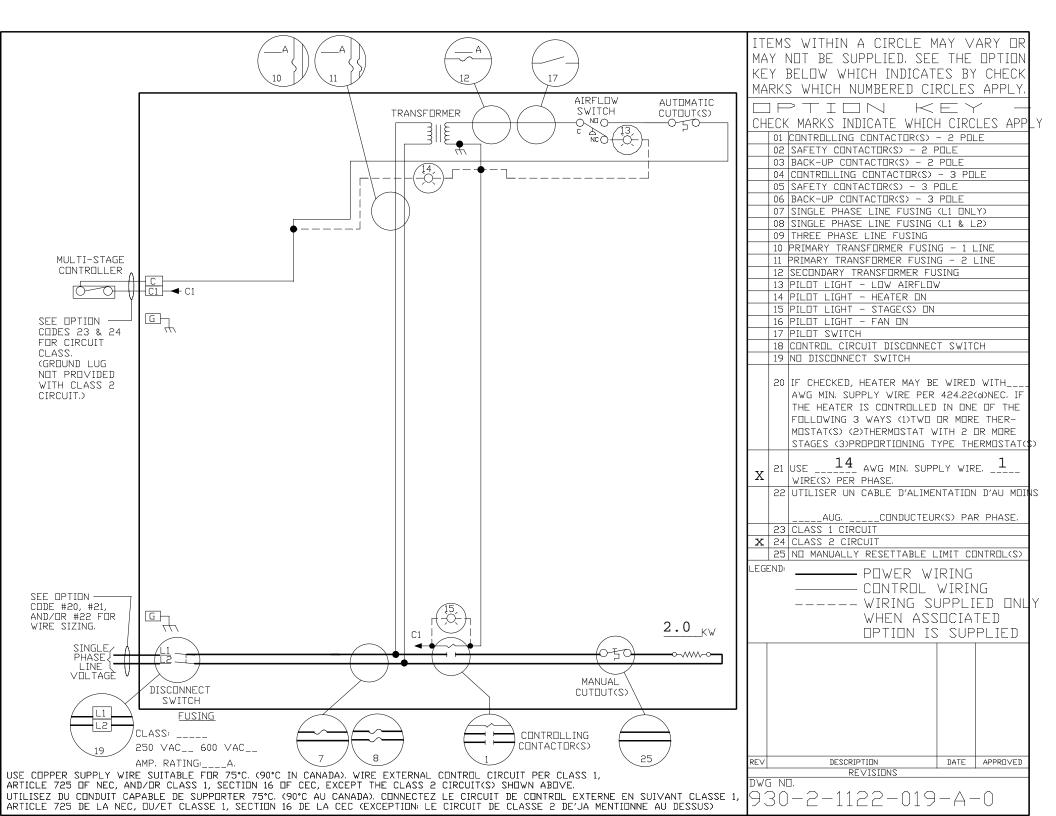
A60, A62	PE Switch-Close on Rise	H1	Aluminized Steel Frame & Terminal Box
		H2	Stainless Steel Frame & Terminal Box
В	Terminal Box-Bottom	НЗ	Stainless Steel Elements
B1	Terminal Box-Side Cover		
B2	Terminal Box-Insulated	L3 to L6	Terminal Box Overhang (See Figs. 10 & 11)
B3	Enclosure-Weatherproof NEMA 4 Type	L7	No Overhang, C=M (See Fig. 7)
84	Enclosure-Dust-Tight-NEMA 12 Type		
B5	Panelboard-Required for Heater Control	M to M7	Manual Thermal Cutout
B7	Enclosure-Dustproof	M8	Stainless Steel Elements
B8	Enclosure-Outdoor-3R Type		
B9	Enclosure-Stainless Steel Weatherproof	N(000)	Fan Relay (000 is control voltage)
	Nema 4X Type		
		P1	Pilot Light Each Stage On
C, C4, C8	Contactor-Magnetic De-energizing	P2	Pilot Light Insufficient Air
C1, C5, C9	Contactor-Magnetic Disconnecting	P3	Pilot Light Heater On
C2, C6, C10	Contactor-Mercury De-energizing	P4	Pilot Light-Overtemperature
C3, C7, C11	Contactor-Mercury Disconnecting		
		Q, Q1	Disconnect Switch-Power
D3	Derated Coils-25 Watts per Square Inch	Q2	Pilot Switch-Control Circuit
D4	Derated Coils-35 Watts per Square Inch	Q3, Q4	Airflow Switch Positive
		Q5, Q6	Airflow Switch Negative
E20 to E23	SCR Controller	Q8	Disconnect Switch-Control Circuit
E30	SCR input-2200 Ohms	Q10	Disc. Switch-Control Circuit Fan Relay
E31	SCR input-135 Ohms		-
E32	SCR input-with transducer		SOLITECH STEP CONTROLLER
E33	SCR input-slave for vernier	S5	2200 Ohm input-Deadband
E34	SCR input-4-20mA	S16	135 Ohm input-Proportional
E35	SCR input-0-10VDC	S18	4-20mA input-Proportional
E36	SCR input-0-10VDC Thermostat	S19	with Transducer-Proportional
	Controlling Master SCR	S20	0-10VDC input-Proportional
E37	SCR input-Pulse Thermostat Controlling	S21	Step Controller-0-10VDC Thermostat
	Slave SCR		
		T1, T5	Control Circuit Transformer, Fused
F	Fuses-Minimum NEC		Primary
F1	Fuses-Per Circuit	T2 to T4	Control Circuit Transformer
F3	Circuit Breaker-Minimum NEC		
F5	Circuit Breaker-Per Circuit	U3 to U9	Airflow Direction (See Figs. 10 & 11)
F6	Time Delay Fusing		
		V	Protective Screens-Both Sides
G1	Slip-and-Drive Connection	V1	Pressure Plate-Inlet Side
G2	Extended Cold Section	V2	Protective Screens-One Side
G3	Recessed Terminal Box		
GG2	Insulated Duct Construction (extended	Z to Z5	Automatic Thermal Cutout
	cold section)		
GG3	Insulated Duct Construction (recessed		
	terminal box)		

Indeeco,425 Hanley Industrial Court, St. Louis, MO, 63144

Phone (314) 644-4300, Fax (314) 644-5332,http://www.Indeeco.com, email ESales@indeeco.com









### Description

The A19 Series are single stage temperature controls that incorporate liquid filled sensing elements.

#### Features

- wide temperature ranges available
- · constant differential throughout the entire
- range
- compact enclosure
- fixed or adjustable differential available
- variety of sensing element styles
- unaffected by cross-ambient conditions

#### Applications

The A19 is suitable for temperature control in heating, ventilating, and refrigeration.

# Y B B

A19 Series

Action on Increase of Temperature

A19 Series Terminal Arrangement for SPDT

a19.eps



A19ABC-24

### **Selection Charts**

 $\rightarrow$ 

# A19 Series Remote Bulb Control<sup>1</sup> INDEECO PN 1023953

Code Number	Switch Action	Range °F (°C)	Diff F° (C°)	Bulb and Capillary	Bulb Well No. (order separately)	Range Adjuster	Max. Bulb Temp. °F (°C)
		·	Adjustable Diffe	rential (Wide Range)		-	-
A19ABA-40C <sup>2</sup>	SPST Open Low	-30 to 100 (-34 to 38)	3 to 12 (1.7 to 6.7)	3/8 in. x 4 in., 6 ft Cap.	WEL14A-602R	Screwdriver Slot	140 (60)
A19ABC-4C	SPDT	50 to 130 (10 to 55)	3 1/2 to 14 (1.9 to 8)	3/8 in. x 5 in., 8 ft Cap.	WEL14A-603R	Knob	170 (77)
A19ABC-24C <sup>3</sup>	SPDT	-30 to 100 (-34 to 38)	3 to 12 (1.7 to 6.7)	3/8 in. x 4 in., 8 ft Cap.	WEL14A-602R	Convertible	140 (60)
A19ABC-36C	SPDT	-30 to 100 (-34 to 38)	3 to 12 (1.7 to 6.7)	3/8 in. x 4 in., 20 ft Cap.	WEL14A-602R	Convertible	140 (60)
A19ABC-37C	SPDT	-30 to 100 (-34 to 38)	3 to 12 (1.7 to 6.7)	3/8 in. x 4 in., 10 ft Cap.	WEL14A-602R	Screwdriver slot	140 (60)
A19ABC-74C	SPDT	-30 to 100 (-34 to 38)	3 to 12 (1.7 to 6.7)	3/8 in. x 4 in., 6 ft Cap.	WEL14A-602R	Screwdriver slot	140 (60)
			Fixed [	Differential			-
A19AAF-12C	SPDT	25 to 225 (-4 to 107)	3 1/2 (1.9)	3/8 in. x 3 in., 10 ft Cap.	WEL14A-602R	Screwdriver slot	275 (135)
			Fixed Differential	(Case Compensated)			-
A19AAC-4C	SPDT	0 to 80 (-18 to 27)	5 (2.8)	3/8 in. x 4 in., 6 ft Cap.	WEL14A-602R	Screwdriver slot	140 (60)
A19AAD-12C	SPST Open Low	-30 to 50 (-34 to 10)	2 1/2 (1.4)	3/8 in. x 4 in., 7 ft Cap.	WEL14A-602R	Screwdriver slot	140 (60)
			Fixed Diffe	rential (Close)	•		
A19AAD-5C <sup>4</sup>	SPST Open Low	30 to 50 (-1 to 10) (Bulk Milk Cooler)	2 1/2 (1.4)	3/8 in. x 2 5/8 in., 6 ft Cap.	WEL16A-601R	Screwdriver slot	190 (88)
A19AAF-20C	SPDT	-30 to 100 (-34 to 38)	2 1/2 (1.4)	3/8 in. x 4 in., 6 ft Cap.	WEL14A-602R	Screwdriver slot	140 (60)
A19AAF-21C	SPDT	40 to 90 (4 to 32)	1 1/2 (0.8)	3/8 in. x 5 3/4 in., 6 ft Cap.	WEL14A-603R	Screwdriver slot	140 (60)
			Manu	ial Reset			
A19ACA-14C	SPST Open Low	-30 to 100 (-34 to 38)	Manual Reset	3/8 in. x 4 in. 6 ft Cap.	WEL14A-602R	Screwdriver slot	140 (60)
A19ACA-15C	SPST Open Low	-30 to 100 (-34 to 38)	Manual Reset	3/8 in. x 4 in. 10 ft Cap.	WEL14A-602R	Screwdriver slot	140 (60)
A19ADB-1C	SPST Open High	100 to 240 (38 to 116)	Manual Reset	3/8 in. x 3 1/2 in. 6 ft Cap.	WEL14A-602R	Knob	290 (143)
A19ADN-1C	SPST Open High	100 to 240 (38 to 116)	Manual Reset	3/8 in. x 4 in. 6 ft Cap.	WEL14A-602R	Screwdriver slot	290 (143)

1. Specify the control model code number, packing nut code number (if required), and bulb well code number (if required).

2. Replaces White-Rodgers 1609-101

3. Replaces White-Rodgers 1609-12, -13; Ranco 010-1408, -1409, - 1410, -1490, 060-110; Honeywell L6018C-1006, L6021A-1005, T675A-1011, -1508, -1516, - 1821, T4301A-1008, T6031A-1011, T6031A-1029

4. Case-Compensated

The performance specifications are nominal and conform to acceptable industry standards. For applications at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products. © 2006 Johnson Controls, Inc. www.johnsoncontrols.com



# Remote Bulb Control (Continued)

## **Selection Charts (Continued)**

#### Replacement Parts

Code Number	Description
CVR28A-617R	Concealed adjustment cover
CVR28A-618R	Visible scale cover
KNB20A-602R	Replacement Knob Kit

## **Technical Specifications**

#### Electrical Ratings

Motor Ratings VAC	120	208	240								
Wide Range – Adjustable Differential											
AC Full Load A	16.0	9.2	8.0								
AC Locked Rotor A	96.0	55.2	48.0								
Non-Inductive A <sup>1</sup>	22 A, 1	20 to 27	7 VAC								
Pilot Duty – 125 VA, 24 to 6	00 VAC										
Fixed Differential and	Close	Differe	ential								
AC Full Load A	6.0	3.4	3.0								
AC Locked Rotor A	36.0	20.4	18.0								
Non-Inductive A 10 A, 24 to 277 VAC											
Pilot Duty – 125 VA, 24 to 277 VAC											

Motor Ratings VAC	120	208	240								
Case Compensated – Fixed Differential A19AAC-4											
AC Full Load A	16.0	9.2	8.0								
AC Locked Rotor A	96.0	55.2	48.0								
Non-Inductive A <sup>1</sup>	22 A, 1	20 to 277	VAC								
Pilot Duty – 125 VA, 24 to 6	500 VAC										
A19AA	D-12										
AC Full Load Amp	6.0	3.4	3.0								
AC Locked Rotor Amp	36.0	20.4	18.0								
Non-Inductive A 10 A, 24 to 277 VAC											
Pilot Duty - 125 VA, 24 to 277 VAC											

#### Accessories

A packing nut is available for closed tank application. Specify the part number **FTG13A-600R**. Bulb wells (WEL14A Series) are available for liquid immersion applications. Refer to the selection chart or to <u>Bulb Wells Catalog Page</u>.

# Electrical Ratings (Continued)

Motor Ratings VAC	120	208	240
Manua	l Reset		
AC Full Load A	16.0	9.2	8.0
AC Locked Rotor A	96.0	55.2	48.0
Non-Inductive Am	16.0	9.2	8.0
Pilot Duty – 125 VA, 24 to	600 VAC	;	

 SPST and N.O. contact of SPDT control; SPDT N.C. contact- 16 amps 120 to 277 VAC

# LIMITED WARRANTY

Industrial Engineering and Equipment Company (INDEECO) new products are warranted against defects in workmanship, material, design, labeling and packaging. No other warranty, expressed or implied, written or oral, applies. No person other than an officer or the general manager of INDEECO is authorized to give any other warranty or assume any liability.

## Warranty Period

This warranty is effective for eighteen months from the date of shipment of the product from INDEECO's factory, or for twelve months from the date the product is first placed into service, whichever period lapses first.

# Conditions of Warranty

INDEECO products must be installed, operated, and maintained in accordance with INDEECO's instructions. INDEECO is not liable for damage or unsatisfactory performance of the product resulting from accident, negligence, alteration, unauthorized repair, improper application or installation of the product, improper specifications, or corrosion. **INDEECO IS NOT LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES**. Claims against carriers for damage in transit must be filed by the purchaser with the carrier.

## Remedy

Contact the INDEECO sales department in St. Louis at (314) 644-4300, for a Return Material Authorization Number (RMA#). Return the part or product in question, freight prepaid, and marked with your company name and the RMA# to:

INDEECO 425 Hanley Industrial Court St. Louis, MO 63144 Attn: Return Goods Manager

If after receipt of the product and the claim, INDEECO finds to its reasonable satisfaction that the product is defective in workmanship, material, design, labeling or packaging, the product will be repaired or replaced, or the purchase price refunded at INDEECO's option. There will be no charge to the purchaser for parts or labor. Removal and reinstallation of the product, and shipment of the product to INDEECO for repair or inspection, shall be at the purchaser's risk and expense.

THE REPAIR, REPLACEMENT, OR REFUND PROVIDED FOR IN THIS LIMITED WARRANTY IS THE EXCLUSIVE REMEDY OF THE PURCHASER. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE TERMS OF THIS LIMITED WARRANTY.