Standard Duct Heaters
Open Coil

QUA Slip-In and QUZ Flanged Heaters

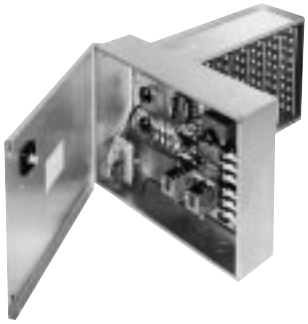

Figure 42.

INDEECO has developed QUA (Figure 42) and QUZ (Figure 44) heater lines to satisfy most typical space heating requirements, simplifying specification, ordering and delivery.

Both standard and quick ship delivery programs are available for the full line of QUA and QUZ heaters.

KW Ratings

QUA and QUZ heaters are available up to 458 KW. The KW ratings are limited both by frame size and electrical characteristics. Heater availability can be determined by contacting an INDEECO representative, who can provide a computerized heater selection with exact heater dimensions in minutes.

Frame Sizes

The use of a standard QUA frame size will both reduce cost and permit rapid shipment. The 240 QUA frame sizes match popular duct sizes. For other duct sizes, INDEECO can either manufacture a custom frame size, or the heater's width and height dimensions can be determined using the 80% Rule, which in most cases will allow the use of a standard QUA frame size.

The 80% Rule – INDEECO recommends the heater should occupy at least 80% of the actual inside area of the duct as shown in Figure 43. Only small amounts of air will bypass the heater around its perimeter and normal turbulence will rapidly mix this unheated air with heated air downstream.

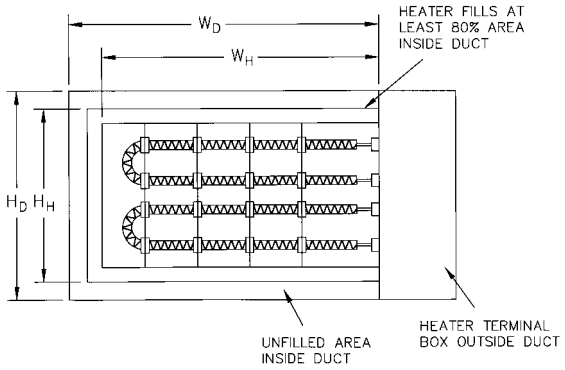

Figure 43.

All QUA heaters may be installed in ducts with up to 1" of interior lining, but the heater must be selected to fit the inside duct dimensions. For example, to fit a duct with 36" x 16" outside dimensions, but with 1" of interior insulation, specify a 35" x 14" heater.

QUZ flanged type heaters are available to fit 216 duct sizes. QUZ cannot be used with interior lined ducts. INDEECO can manufacture a custom frame size to meet virtually any application.

Figure 44.

Table VII

Sizes and Maximum KW Ratings

Duct Width	Duct Height 6"	8"	10"	12"	14"	16"	18"	20"	24"	30"
8"	7	10	14	17	21	23	26	29	36	46
10"	9	13	17	22	26	29	34	38	46	59
12"	11	16	21	27	32	36	41	46	56	72
14"	13	18	25	31	37	42	48	54	67	85
16"	15	21	28	36	43	49	56	63	77	98
18"	17	24	32	40	48	55	63	71	87	111
20"	19	27	36	45	54	61	70	79	97	123
22"	21	29	39	49	59	68	78	87	107	136
24"	23	32	43	54	65	74	85	96	117	149
26"	25	35	47	59	71	81	92	104	127	162
28"	27	38	51	63	76	87	100	112	137	175
30"	29	41	54	68	82	94	107	121	147	188
32"	31	43	58	72	87	100	114	129	158	201
34"	32	46	62	77	93	107	122	137	168	214
36"	34	49	65	82	98	113	129	145	178	226
38"	36	52	69	86	104	119	136	154	188	239
40"	38	54	73	91	109	126	144	162	198	252
42"	45	57	76	95	115	132	151	170	208	265
44"	47	60	80	100	120	139	159	178	218	278
48"	52	65	87	109	131	152	173	195	238	304
54"	58	74	98	123	148	171	195	220	269	342
60"	65	82	109	137	164	190	217	245	299	381
66"	71	90	120	151	181	209	239	269	329	419
72"	78	98	131	164	197	229	262	294	360	458

Type QUA
Slip-in Heater

Maximum KW ratings in available frame sizes shown at left.

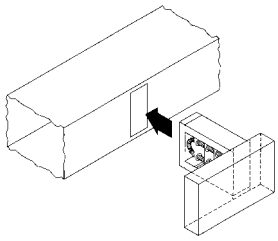

Figure 45.

Installation of Slip-in Heater

Duct Width	Duct Height 6"	8"	10"	12"	14"	16"	18"	22"	28"
8"	11	14	18	22	25	29	33	40	51
10"	13	18	22	27	32	36	41	50	64
12"	16	22	27	33	38	44	49	60	77
14"	19	25	32	38	45	51	57	70	90
16"	22	29	36	44	51	58	66	80	102
18"	24	33	41	49	57	66	74	91	115
20"	27	36	45	55	64	73	82	101	128
22"	30	40	50	60	70	80	91	111	141
24"	33	44	55	66	77	88	99	121	154
26"	35	47	59	71	83	95	107	131	167
28"	38	51	64	77	90	102	115	141	180
30"	41	55	68	82	96	110	124	151	193
32"	44	58	73	88	102	117	132	161	205
34"	46	62	78	93	109	125	140	171	218
36"	49	66	82	99	115	132	148	182	231
38"	52	69	87	104	122	139	157	192	244
40"	55	73	91	110	128	147	165	202	257
42"	57	77	96	115	135	154	173	212	270
44"	60	80	101	121	141	161	182	222	283
48"	66	88	110	132	154	176	198	242	308
54"	74	99	124	148	173	198	223	273	347
60"	82	110	137	165	193	220	248	303	386
66"	91	121	151	182	212	242	273	333	424
72"	99	132	165	198	231	264	297	364	458

Type QUZ
Flanged Heater

Maximum KW ratings in available frame sizes shown at left.

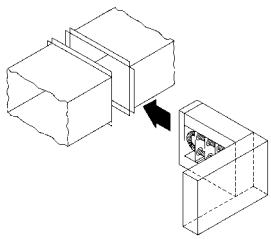

Figure 46.

Installation of Flanged Heater

Note: Maximum KW ratings may vary based on voltage and phase combination.

Detail Dimensions

The wide variety of QUA and QUZ (Figures 45 and 46) heaters makes it impractical to list the exact heater dimensions for every possible heater. For dimensional details, contact your local INDEECO representative.

Voltage and Phase

Heaters are available in the voltage and phase combinations shown below. All are for operation at 50 or 60 Hz.

When three-phase is specified, each heating stage will be furnished with a multiple of three elements to give a balanced three-phase load.

Voltage	120 208 240 277	208 240 380 400 415 480 600
Phase	1	3

Control Circuit Options & Special Features

QUA and QUZ heaters are available with Control Options G, J and K and a full range of Special Features. These are described briefly in **Table VIII** and in more detail in the standard Control Options section of this catalog, pages 10 and 11.

Number of Heating Stages

Single and three-phase QUA and QUZ heaters are available with multiple heating stages. To comply with our UL and NEC maximum circuit sizes, no stage is rated at more than 48 amps.

Table VIII

Control Options

Control Option	Disconnect Switch	Thermal Cutouts	Airflow Switch	Contactors	Control Transformer	Fuses	PE Switches	SCR	Thermostat
G Basic	■	■	■	■	■	■ [1]			
J Pneumatic	■	■	■	■ [2]	■ [3]	■ [1]	■		
K Proportional	■	■	■	■ [2]	■	■ [1]		■	■ [4]

Notes: 1. Fuses supplied only on heaters over 48 amps.
2. Contactors supplied only when other devices cannot carry heater load.
3. Transformer only supplied on heaters rated higher than 277 volts.
4. Choice of room or duct thermostat, 135 ohms, 2200 ohms, 0-10 VDC or 4-20 mA inputs. See pages 12 and 13 for full description of thermostats.

Special Features

While QUA slip-in and QUZ flanged heaters may be specified with one of the standard control circuit options, individual job requirements may demand slight variations from the standards. The most common variations are covered by INDEECO's set of Special Features which may be used to modify QUA/QUZ heaters both mechanically and electrically. These are listed in **Table IX** with a brief description, availability and notes on any limitations of their use.

Table X provides a summary of thermostats offered with INDEECO QUA/QUZ heaters. See pages 12 and 13 for more detailed descriptions.

Table IX

Special Feature	Special Feature Code (SFC)	Description	Page Ref.	Availability & Limitations
Mechanical				
Substitute Negative Pressure Airflow Switch	Q5/Q6	Allows heater to be used on inlet side of fan.	15	Available on all heaters.
Vertical Airflow	U9	Allows heater to be used in applications where airflow is either vertical up (U3) or vertical down (U5).	23	Available on all heaters.
Right/Down Terminal Box Overhang	L4/L5	Heater will be supplied with terminal box overhang on right (if horizontal airflow installation) or downward (if vertical airflow installation).	23	Available on all heaters.
Insulated Terminal Box	B2	Prevents condensation inside terminal box when heater is installed in air conditioning duct running through un-airconditioned area.	37	Available on all heaters.
Dust-Tight Terminal Box	B7	Allows installation in dusty areas and satisfies local codes requiring dust-tight box if installed in area used as return air plenum.	36	Available on all heaters.
Remote Panelboard	B5	All controls except thermal cutouts, airflow switch and a pilot switch will be supplied in a separate NEMA 1 panelboard.	39	Available on all heaters except when transformer and contactors are deleted.

Table IX (continued)

Special Feature	Special Feature Code (SFC)	Description	Page Ref.	Availability & Limitations
Electrical				
Delete Transformer	—	Allows control circuit to be obtained from source outside the heater or, when line voltage is equal to control voltage, directly from power lines within the heater.	16	Only available on Option G heaters. Must be specified if control voltage is not 120 or 24 volts. Customer must specify control volts.
Delete Transformer & Contactors	—	Allows for control of heater directly using load carrying thermostats.	16	Available only on single stage, single-phase, Option G heaters with KW not exceeding the following: **Voltage** 120 | 208 | 240 | 277 **Max. KW** 1.8 | 3.1 | 3.6 | 4.1
Delete Disconnect	—	Allows for use of field installed disconnecting means. (Must be within sight of the heater.)	17	Available on all heaters.
Add Fuses for Heaters Rated 48 Amps or Less	F1	Allows for addition of one set of fuses to low amperage heaters that do not need internal fusing to meet UL and NEC requirements.	16	Available on all heaters whose KW is lower than or equal to the following. (Other heaters include fusing as standard): **Line Volts** | **KW (at 48 amps) 1 Phase** | **3 Phase** 120 | 5.7 | — 208 | 9.9 | 17.2 240 | 11.5 | 19.9 277 | 13.2 | — 480 | 23.0 | 39.9
Add “Stage On” Pilot Light(s)	P1	To indicate when each heating stage is producing heat.	17	Available on all heaters except Option K SCR stages.
Add “Low Airflow” and “Heater On” Pilot Lights	P2, P3	Separate pilot lights to indicate that power has been supplied to the heater and it is ready for operation and whether airflow has been interrupted.	17	Available on all heaters. When fan relay has been substituted for airflow switch, only “Heater On” will be supplied.
Substitute Disconnecting Contactors	C1, C3	To meet local codes which require that contactors break all ungrounded conductors.	16	Available on all Option G heaters, all three-phase Option J & K, and single-phase Option J & K heaters whose KW exceeds the following (lower KW single-phase heaters do not use contactors): **Voltage** | 120 | 208 | 240 | 277 **KW Opt. J** | 1.8 | 3.1 | 3.6 | 4.1 **KW Opt. K** | 3.0 | 5.2 | 6.0 | 6.0

Table IX (continued)

Special Feature	Special Feature Code (SFC)	Description	Page Ref.	Availability & Limitations
Electrical (cont.)				
Substitute Mercury Controlling Contactors	C2	For silent operation or where long term reliability is crucial. Only controlling contactors will be mercury. Any safety contactors will be magnetic, as they rarely operate.	16	Available on Option G & J* heaters when KW per stage does not exceed the following: **KW/Stage** **Volts** 120 208 240 277 480 **1 Ph.** 4.2 7.2 8.4 9.6 16.8 **3 Ph.** — 12.6 14.5 — 29.0 * No contactors required in Option J heaters per **Table II**, page 10. Available on option K heaters only when total KW exceeds values shown in **Table III**, page 11. (Controlling contactors used only with the vernier control system.)
Fan Relay	N	When static pressure in the duct is too low (below .07" WC) to operate the airflow switch or when airflow switch is not desired.	15	Available on Option G & K heaters except Option G heaters where deletion of contactors and transformer is specified.
Add INDEECO Electronic Step Controller	S	Allows better temperature control of high capacity heater by using multiple stages controlled by electronic thermostat and step controller.	19-20	Only available on Option G heaters with 2 or more heating stages. NOT AVAILABLE ON ORDERS FOR 1 WEEK OR 72 HOUR DELIVERY.
Low Watt Density Coils	D3, D4	To meet specifications which call for low watt density coils.	—	Available on all heaters.
Add Built-in PE Transducer	E32, S19	To allow for pneumatic control.	12	Available on Option K heaters or on Option G heaters with step controller and 6 or more stages.
Transformer Primary Fusing	T1	Add transformer primary fusing.	—	Available with all heaters with built-in transformer.

Table X

Summary of Thermostats Available with Option G or K Heaters (No Thermostats are supplied on Option J Heaters)

Type of Thermostat			Use with Control Option	Catalog Number	Comments
ROOM	Pilot Duty	1 Stage	G	1006998 (Fig. 11)	Rated for 30 volts max.
		2 Stage	G	1007030 (Fig. 12)	Rated for 240 volts max.
	†Proportional Electronic		G or K	SCR Controlled or 2-4 Stages 1016941 (Fig. 14) Vernier Controlled or over 4 Stages 1007101 (Fig. 13)	With Option G, can be used only when step controller is also specified.
DUCT	Pilot Duty	1 Stage	G	1019682 (Fig. 16)	Rated for 277 volts max.
		2 Stage	G	1007044 (Fig. 17)	Rated for 240 volts max.
	†Proportional Electronic		G or K	SCR Controlled or 2-4 Stages 1016942, 1016941 (Fig. 19) Vernier Controlled or over 4 Stages 1001083, 1001068 (Fig. 18)	With Option G, can be used only when step controller is also specified.
	† No Thermostat (Special inputs for controller or SCR when customer supplied thermostat is used)		G or K	— — —	2200 ohm Input 135 ohm Input 4-20 mA Input 0-10 VDC Input

†A thermostat or input must be specified with all Option K heaters and all Option G heaters with step controllers. Step controllers with 4-20 mA or 0-10 VDC will be furnished with proportional control.

QUA/QUZ – Sample Specification

A job specification can be prepared by using the following information. Simply darken the applicable circles. Material which is part of the basic specification has already been darkened. Additional copies of this specification guide are available from your local INDEECO representative.

● 1. Duct heaters shall be INDEECO
  ○ Type QUA Standard Slip-in Heaters
  ○ Type QUZ Standard Flanged Heaters

● 2. Approvals – Heaters and panelboards (if required) shall meet the requirements of the National Electrical Code and shall be listed by Underwriters Laboratories for zero clearance to combustible surfaces and for use with heat pumps and air conditioning equipment.

● 3. Heating elements shall be open coil, 80% nickel, 20% chromium, Grade A resistance wire. Type C alloys containing iron or other alloys are not acceptable. Coils shall be machine crimped into stainless steel terminals extending at least 1" into the airstream and all terminal hardware shall be stainless steel. Coils shall be supported by ceramic bushings staked into supporting brackets.

● 4. Heater frames and terminal boxes shall be corrosion resistant steel. Unless otherwise indicated, the terminal box shall be NEMA 1 construction and shall be provided with a hinged, latching cover and multiple concentric knockouts for field wiring.

● 5. All heaters shall be furnished with a disc type, automatic reset thermal cutout for primary overtemperature protection. All heaters shall also be furnished with disc type, load carrying manual reset thermal cutouts, factory wired in series with heater stages for secondary protection. Heat limiters or other fusible overtemperature devices are not acceptable.

● 6. Heaters shall be rated for the voltage, phase and number of heating stages indicated in the schedule. All three-phase heaters shall have equal, balanced, three-phase stages. All internal wiring shall be stranded copper with 105°C insulation and shall be terminated in crimped connectors or box lugs.

● 7. Terminal blocks shall be provided for all field wiring and shall be sized for installation of 75°C copper wire rated in accordance with NEC requirements.

● 8. Heaters shall be furnished either with the Control Option specified in the schedule and described below or with the specific components listed in the schedule.

○ Option G – Thermal cutouts, airflow switch, contactors, fuses (if over 48 amps), control circuit transformer (where required) and built-in, snap-acting, door interlocked disconnect switch.

○ Option J – Thermal cutouts, airflow switch, PE switches, contactors (where required), fuses (if over 48 amps), control circuit transformer (where required), and built-in, snap-acting, door interlocked disconnect switch.

○ Option K – Thermal cutouts, airflow switch, SCR (with step controller if heater draws over 96 amps three-phase or 192 amps single-phase), fuses (if over 48 amps), control circuit transformer and built-in, snap-acting, door interlocked disconnect switch.

○ 9. When specified in the schedule, or below, heaters will be supplied with the following Special Features:
  ○ Airflow switch for negative pressure operation
  ○ Insulated terminal box
  ○ Dust-tight terminal box
  ○ Controls mounted in NEMA 1 type remote panelboard
  ○ Deletion of transformer
  ○ Deletion of transformer and contactor
  ○ Transformer primary fusing
  ○ Deletion of disconnect switch
  ○ Fuses for heaters rated 48 amps or less
  ○ “Low Airflow” pilot light
  ○ “Heater On” pilot light
  ○ Each “Stage On” pilot light(s)
  ○ Disconnecting contactors
  ○ Mercury controlling contactors
  ○ Fan relay (instead of airflow switch)
  ○ Fan relay (in addition to airflow switch)
  ○ Step controller
  ○ 25 watt per square inch resistance coils
  ○ 35 watt per square inch resistance coils
  ○ Built-in PE transducer

○ 10. When specified in the schedule, or below, heaters shall be supplied with the following thermostats:
  ○ Pilot duty single stage room thermostat
  ○ Pilot duty two stage room thermostat
  ○ Proportional electronic room thermostat
  ○ Pilot duty single stage duct thermostat
  ○ Pilot duty two stage duct thermostat
  ○ Proportional electronic duct thermostat with set point adjuster
  ○ Special inputs (135 ohms, 2200 ohms, 4-20 mA, 0-10 VDC)

○ 11. Duct Heater Schedule – Use of the following typical format will insure that all necessary information is available to bidders:

Item or Tag #	Heater Type	KW	Duct Dimensions (Inches)		Supply Line		No. of Heating Stages	Control Circuit Voltage	Control Option	Special Features	Thermostats
			W (Width)	H (Height)	Volts	Phase					
H -1	QUA	10	24	12	208	3	2	24	G	Vertical Airflow Pilot Light	Room
H -2	QUZ	15	16	12	240	3	1	240	J	Insulated Terminal Box	None
H -3	QUA	39.9	38	24	480	3	1	24	K	Remote Panelboard	Duct