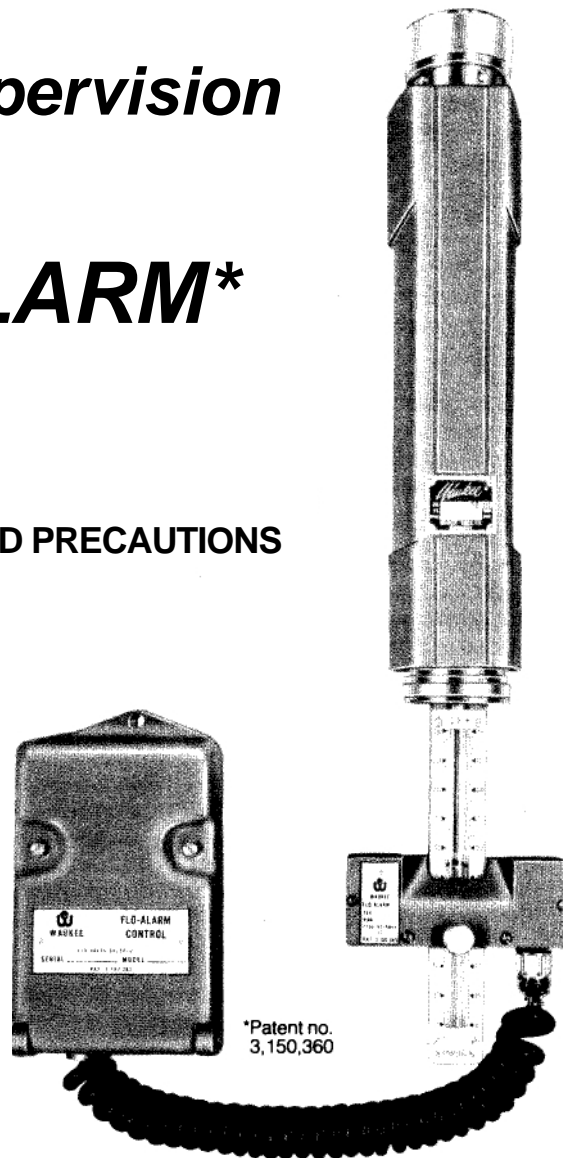


Gas Flow protection/supervision with **WAUKEE FLO-ALARM***

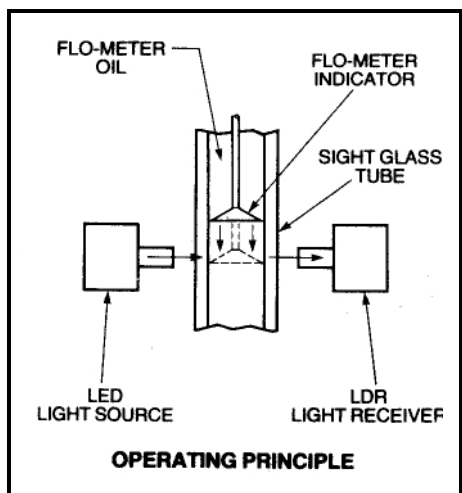
DESCRIPTION, INSTRUCTIONS, WARNINGS AND PRECAUTIONS All Models with Serial No. beginning with R4-

All Flo-Alarms whose serial number begins with **R4-** have a light emitting diode (LED) as the light source, and a light dependent resistor (LDR) as the light receiver. This Bulletin No. 182 is for use **only** with Waukee Flo-Alarms that have the LED source and LDR receiver. For all users of all models whose serial number does **not** begin with **R4-**, please consult Waukee Factory before using or continuing to use same. Read and become familiar with this Bulletin No. 182 before installing, connecting and/or using the Waukee Flo-Alarm.



OPERATING PRINCIPLE

When the Flo-Meter indicator interrupts the path of light to the light receiver, an electronic network actuates a relay which will provide an electrical signal which can be used in a control or alarm circuit, system or device.



DESCRIPTION

The Waukee Flo-Alarm can give you 24-hour supervision and signal you of too low a flow of hydrogen, dissociated ammonia, carrier, natural or other gases to furnaces.

Flo-Alarm can also be used to detect and signal excess flow in processes using costly gases such as argon or helium.

The Flo-Alarm will furnish an immediate signal of a gas flow failure, either too little flow or excess flow, depending how you externally wire it. See "To Install" and the circuit diagram.

Flo-Alarm operates as an attachment to the standard Waukee FloMeter. The Flo-Alarm sensing unit fastens right

on the guard of the Flo-Meter and is easily adapted to all Type "S," Type "M" and Type "L" Waukee Flo-Meters, including those already in the field. It comes in three sizes, for either the "S," "M" or "L" type Flo-Meters. The standard Flo-Alarm can be set for either low-flow or high-flow signal, as desired; a combination type is available for both high-flow and low-flow signals.

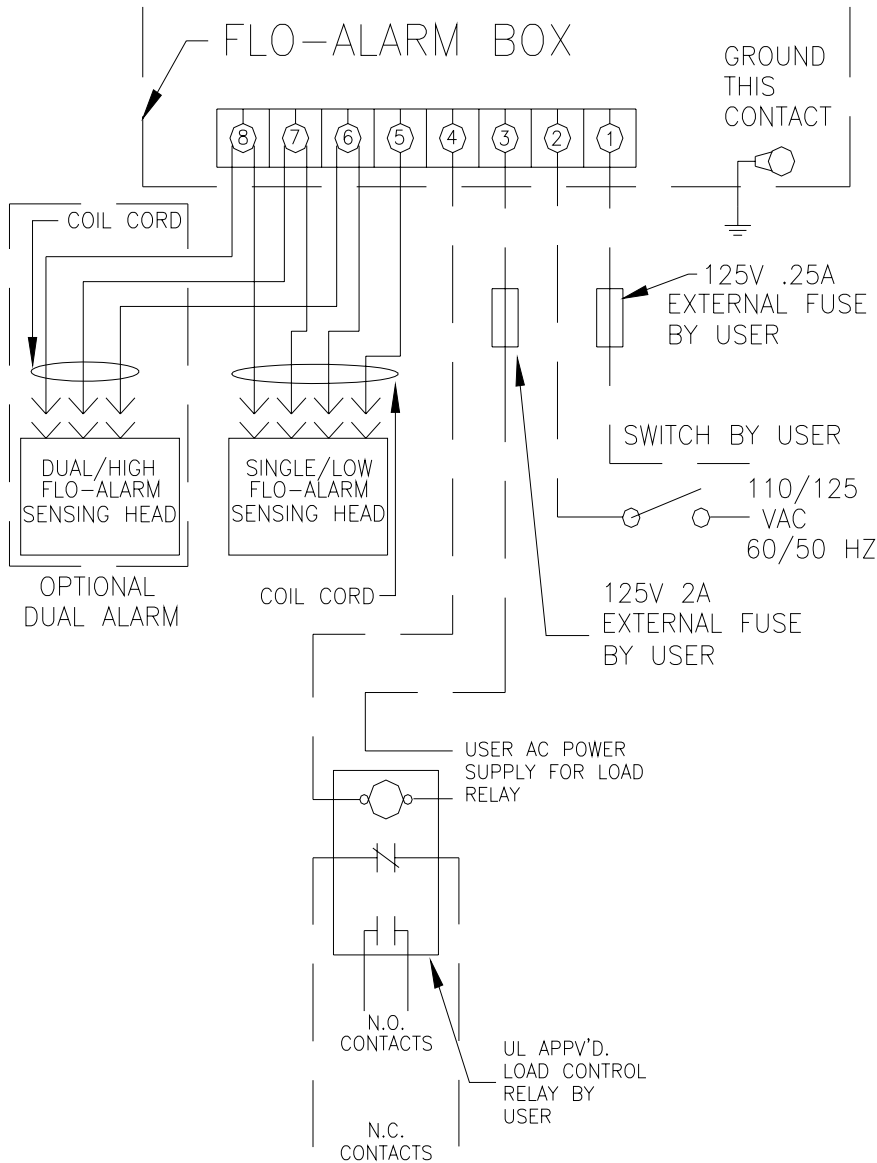
Gas flow protection and/or supervision by the Waukee Flo-Alarm is dependent upon an uninterrupted appropriate electrical power supply to the Flo-Alarm and to any devices or equipment electrically connected to the Flo-Alarm.



WAUKEE ENGINEERING CO., INC.

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Plug cable from control box into the sensing head. Slide Flo-Alarm sensing head on to Flo-Meter guard and clamp it on to the guard at the desired gas alarm flow rate by use of the thumbscrew on the sensing head. Tighten sufficiently to avoid slippage or movement. Switch power On.

If unit is wired to the normally closed (N.C.) contacts and no gas is flowing, the alarm circuit will now be energized through the normally-closed contacts in the load control relay. Run the specified gas or air through the Flo-Meter until the float rod or indicator no longer interrupts the light beam. The alarm should now stop.

If unit is wired to the normally open (N.O.) contacts and no gas is flowing, the alarm circuit will be de-energized through the normally-open contacts in the load control relay. Run the specified gas or air through the Flo-Meter until the float rod or indicator no longer interrupts the light beam. The alarm should now start by closing the normally-open contacts in the load control relay.

OPERATION

The Flo-Alarm is a simple device operating on the photo-electric principle as shown schematically on page 1.

One standard Flo-Alarm circuit is designed to operate a separate load control relay which allows complete flexibility with maximum relative reliability of any connected system for either a low-flow or a high-flow signal. If both a low-flow signal and a high-flow signal are required, an additional sensing head and cable must be purchased.

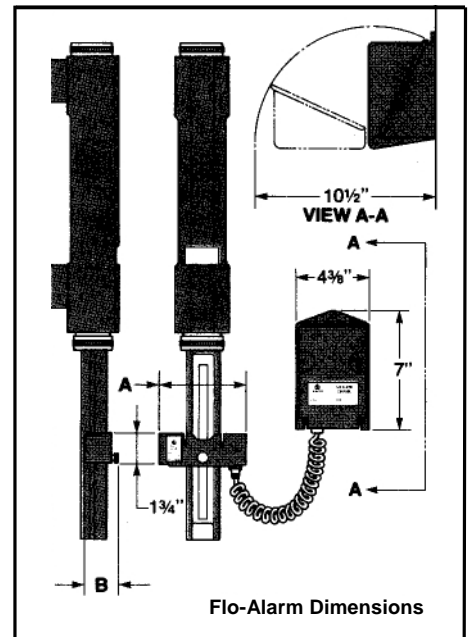
A separate UL-approved (or equivalent rating by an agency in your country of usage) load control relay is required to prevent damage to the Flo-Alarm circuitry and components, which can happen by user error, causing overloading of the solid state relay (SSR) in the Flo-Alarm circuit.

When the light beam is aimed at and striking the light dependent resistor, the solid state relay (SSR) contacts close and complete the circuit to isolated

terminals No. 3 and No. 4. These must be connected to the coil of a separate UL-approved load control relay. When the Flo-Meter indicator or float rod interrupts the light beam, the solid state relay whose contacts are designed to open, break the circuit to terminals No. 3 and No. 4, which de-energizes the coil of the load control relay.

TO INSTALL

Mount the Flo-Alarm control box near the Flo-Meter with which the Flo-Alarm will be used. The standard cable supplied by Waukee to connect the sensing head to the control box is 4 feet long. Wire isolated terminals No. 3 and No. 4 through the coil of the separate UL-approved load control relay. Wire through your own UL-approved "On-Off" switch, 115 volt, 60/50 Hz AC electrical supply to terminals No. 1 and No. 2. (Keep power switch in OFF position)



DIM.	TYPE OF FLO-ALARM		
	"S"	"M"	"L"
A	4 1/4"	4 1/2"	5"
B	1 3/4"	1 3/4"	2"

Control Box Dimensions are the same for all three types.

ADDITIONAL WARNINGS AND PRECAUTIONS

Gas flow protection and/or supervision by the Waukee Flo-Alarm is dependent upon an uninterrupted appropriate electrical power supply to the Flo-Alarm and to any devices or equipment electrically connected to the Flo-Alarm.

The Waukee Flo-Alarm is a relative safety device and its operation should be verified daily to make certain it is functioning properly. This can be done by moving the Flo-Alarm sensing head on the Flo-Meter guard so the light beam is interrupted if wired for a low-flow alarm, or the light beam is uninterrupted if wired for a high-flow alarm, either of which should actuate the alarm circuit. If after doing the above, the alarm circuit is not activated, **do not use or rely upon** it until situation is rectified. Return the sensing head back to its required control position after this check if the Flo-Alarm is operating properly.

CAUTION: The reflective tape on the sight glass tube must not interfere with the light beam traveling through the slots in the sight glass tube guard.

Make sure that the Flo-Meter oil in the sight glass tube is clean. Dirty oil can cause the Flo-Alarm to malfunction. The oil in the sight glass tube must not be any darker than the left side of the "Dirty Oil Gauge," Waukee Bulletin No. 1281. The "Dirty Oil Gauge" can be slipped thru the slot in the Flo-Meter guard to directly compare it with the darkness of the

oil in the sight glass tube. If the oil in the sight glass tube is darker than the "Dirty Oil Gauge" do not under any circumstances use or rely upon the Flo-Alarm until the sight glass tube has been cleaned and the oil in the sight glass tube has been replaced with clean Waukee Flo-Meter oil. If you do not have Bulletin No. 1281 with your Flo-Alarm instructions, contact Waukee factory to obtain one.

If the sensing head has to be disassembled for any reason, correct alignment of the LED housing and the LDR housing must be verified upon reassembly. Failure to do so can render the Flo-Alarm useless and present a risk of serious personnel injury and property damage where combustible or explosive gas mixtures are present. Verify correct alignment as follows:

- 1) Install the four screws which hold the LED housing and the LDR housing to the face plate and tighten the four screws—snugly, but so you can still move the housings slightly.
- 2) Plug in the coil cord and apply power to the unit.
- 3) Place a piece of white paper over the receiver hole in the LDR holder and align both housings so that the red light beam from the LED is aligned over the receiver hole in the LDR holder.
- 4) Then tighten all four screws that retain the housings to the face plate. See illustration below.

Input voltage range must be between 110 and 125 volts AC, 60/50 Hz. The solid state relay (SSR) contacts are rated .02 amp minimum and 3 amps maximum at 110 volts or at 220 volts AC.

ENVIRONMENTAL LIMITATIONS OF WAUKEE FLO-ALARMS

1. Do not operate Waukee Flo-Alarms in ambient temperatures exceeding 132°F (54°C) or at ambient temperatures below 50°F (10°C).
2. Do not operate Waukee Flo-Alarms outdoors unless completely protected from the elements.
3. Do not operate Waukee Flo-Alarms in corrosive environment. If in doubt, contact Waukee factory before specifying, installing, or using.
4. Do not operate Waukee Flo-Alarms in hazardous atmospheres as defined by N.F.P.A. (National Fire Protection Association) Class 1, Division 1, Groups A, B, C, and D, nor Class II Division I, Groups E, F and G.

If intended operating conditions are outside of limits established above, or if you have any questions as to suitability of Waukee Equipment for your application, please contact Waukee Factory before ordering, specifying or using the Flo-Alarm or associated equipment.

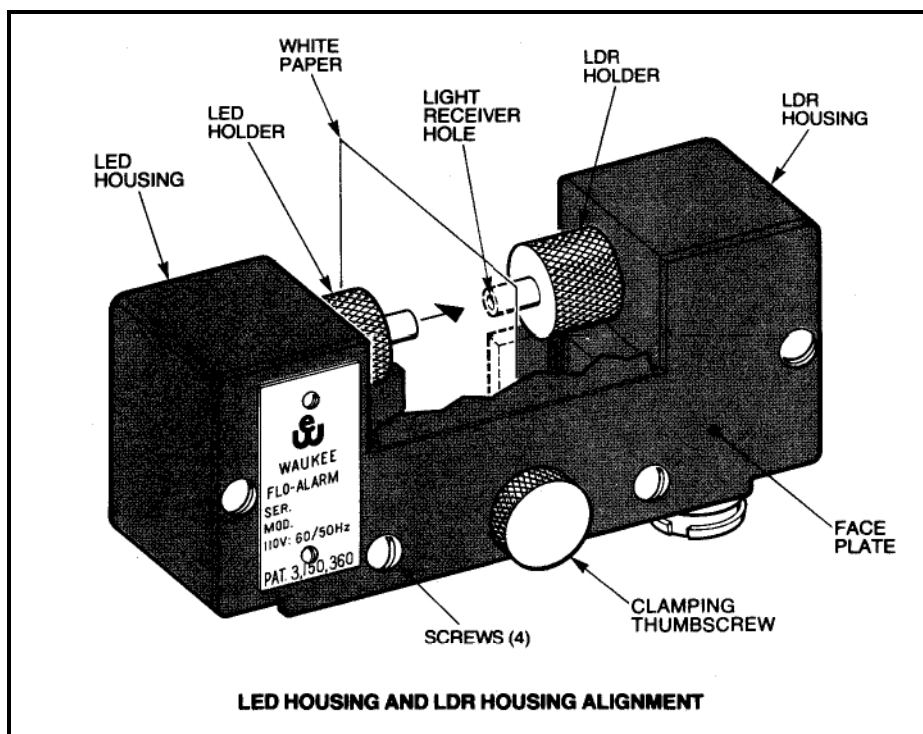
Do not under any circumstances attempt to by-pass, shortcut or eliminate any circuitry or relative safety features of this equipment or the installation, operation or maintenance bulletins, instructions and any advisories. The consequences can be serious personnel injury and property damage.

WAUKEE WARRANTY, WARRANTY POLICY, DISCLAIMER AND LIMITATION OF LIABILITY

1. EXPRESS WARRANTY ON WAUKEE EQUIPMENT.

WAUKEE warrants its products for a period of one (1) year from date of shipment from WAUKEE to the original purchaser to be free from defects in material and workmanship under normal recommended use, service, inspection and maintenance. Normal recommended use, service, inspection and maintenance mean:

- A.** Not to be used in excess of nor below the rated capacity, pressures, and temperature ranges specified in the applicable quotation, purchase order, acknowledgment, marketing literature, nameplate(s), specification sheet or the Installation, Operation, Inspection and Maintenance Manual (THE MANUAL):
- B.** Using only clean liquids or gases (only liquids in liquid Flo-Meters and only gases in gas Flo-Meters); air and fuel gases used in mixing equipment to be clean and free of solids all as further explained in



THE MANUAL and;

C. Installation, operation, inspection and maintenance in compliance with THE MANUAL and;

D. The WAUKEE products being used only in:

(1) Ambient environments lower than 132° Fahrenheit (54° Celsius) unless specially designed, and so labeled, by WAUKEE, for higher temperatures and,

(2) Non-corrosive environments and,

(3) Completely protected from moisture, rain, snow or other outside environments and,

(4) Not to be used below 32° Fahrenheit (0° Celsius) unless special precautions are taken for low temperature conditions as shown in THE MANUAL.

E. Being used only for applications permitted by THE MANUAL or other WAUKEE literature or special applications approved in a separate written authorization by WAUKEE.

2. This Warranty does not apply to damage caused by any or all of the following circumstances or conditions:

A. Freight damage;

B. Parts, accessories, materials or components not obtained from or approved in writing by WAUKEE;

C. Any consequential or incidental damages including but not limited to loss of use, loss of profits, loss of sales, increased costs, arising from the use of any product, system or other goods manufactured or sold by WAUKEE;

D. Misapplication, misuse and failure to follow THE MANUAL or other literature, instructions or bulletins (including drawings) published or distributed prior to THE MANUAL.

The exclusive remedy under this Warranty or any other express warranty is the repair or replacement without charge for labor and materials of any WAUKEE parts found upon examination by WAUKEE to have been defective. Since certain WAUKEE equipment is heavy, bulky and not deliverable by U.S. mail or other parcel service, WAUKEE equipment may be returned only upon written consent of WAUKEE and then only to the location designated by WAUKEE. Generally such consent will be given only upon the condition that the customer assume and prepay all carrier charges and responsibility for damage in transit.

3. Purchasers of WAUKEE products, equipment or goods waive subroga-

tion on all items covered under their own or any other insurance.

DISCLAIMER

This warranty is exclusive. Waukee expressly disclaims any and all other warranties, whether express or implied, including any implied warranty of merchantability, of fitness for a particular purpose, or any purpose.

No person, including any dealer, seller or other representative of WAUKEE, is authorized to make on behalf of WAUKEE any representations beyond those contained in WAUKEE literature and documents or to assume for WAUKEE any obligations or duties not contained in this warranty and warranty policy. WAUKEE reserves the right to make design and other changes, modifications or improvements upon its products or systems, without any obligation to furnish or install same on any previously sold or delivered products or systems.

4. Limitation of Liability.

It is expressly agreed that the liability of WAUKEE is limited and WAUKEE does not function as an insurer. The purchaser and/or user agree that WAUKEE is not liable for loss, harm or damage due directly or indirectly to any occurrence or consequences there from. If WAUKEE should be found liable to anyone on any theory (except any express warranty where the remedy is set forth in Section 2 of this Warranty and Warranty Policy) for loss, harm or damage, the liability of WAUKEE shall be limited to the lesser of the actual loss, harm or damage or the purchase price of the involved WAUKEE equipment when sold by WAUKEE to its customer. This liability is exclusive and regardless of cause or origin resulting directly or indirectly to any person or property from:

A. The performance or nonperformance of any obligations set forth in this Warranty and Warranty policy;

B. Any agreement including specifications between WAUKEE and the customer;

C. Negligence, active, passive or otherwise of WAUKEE or any of its agents or employees;

D. Breach of any judicially imposed warranty or covenant of workmanship, durability or performance, and;

E. Misrepresentation (under the Restatement, common law or otherwise) and/or strict liability involvement.

5. Information Necessary to Obtain Technical Assistance.

For WAUKEE to appropriately respond to a request for assistance or evaluation of customer or user operating difficulty,

please provide at a minimum the following information:

A. Serial number and type of meter, compressor, Skimmo or other equipment and all other data shown on the nameplate and on the specific component which appears to be involved in the difficulty;

B. The date and from whom you purchased your WAUKEE equipment and your purchase order number.

C. State your difficulty, being sure to mention at least the following:

(1) Application.

(2) Input pressure where FloMeters or compressors are involved.

(3) Condition of filters, strainers or screens, upstream or downstream of the WAUKEE equipment.

(4) Gas or liquid temperatures and other ambient conditions at the time of the difficulty.

(5) Type of lubrication being used, if any - give specifics.

(6) Any other relevant pressures including gauge readings both upstream and downstream of the WAUKEE equipment.

(7) All electrical information available.

(8) Performance activity.

(9) Other.

If a sketch would help explain the difficulty, please include one.

6. If warranty Field Service at the request of the purchaser or user is rendered and the difficulty is found not to be with WAUKEE's product, the purchaser shall pay the time and expense (at the prevailing rate at the time of the service) of WAUKEE'S field representative(s). Charges for service, labor and other expenses that have been incurred by the purchaser, its customer or agent, without written approval of WAUKEE will not be accepted. The OEM or other reseller is responsible for transmitting installation and operating instructions, THE MANUAL or other service literature supplied by WAUKEE with the equipment.

For service contact:

Waukee Engineering Co., Inc.

Phone: 414-462-8200

FAX: 414-462-7022