PATTERSON-KELLEY CO.

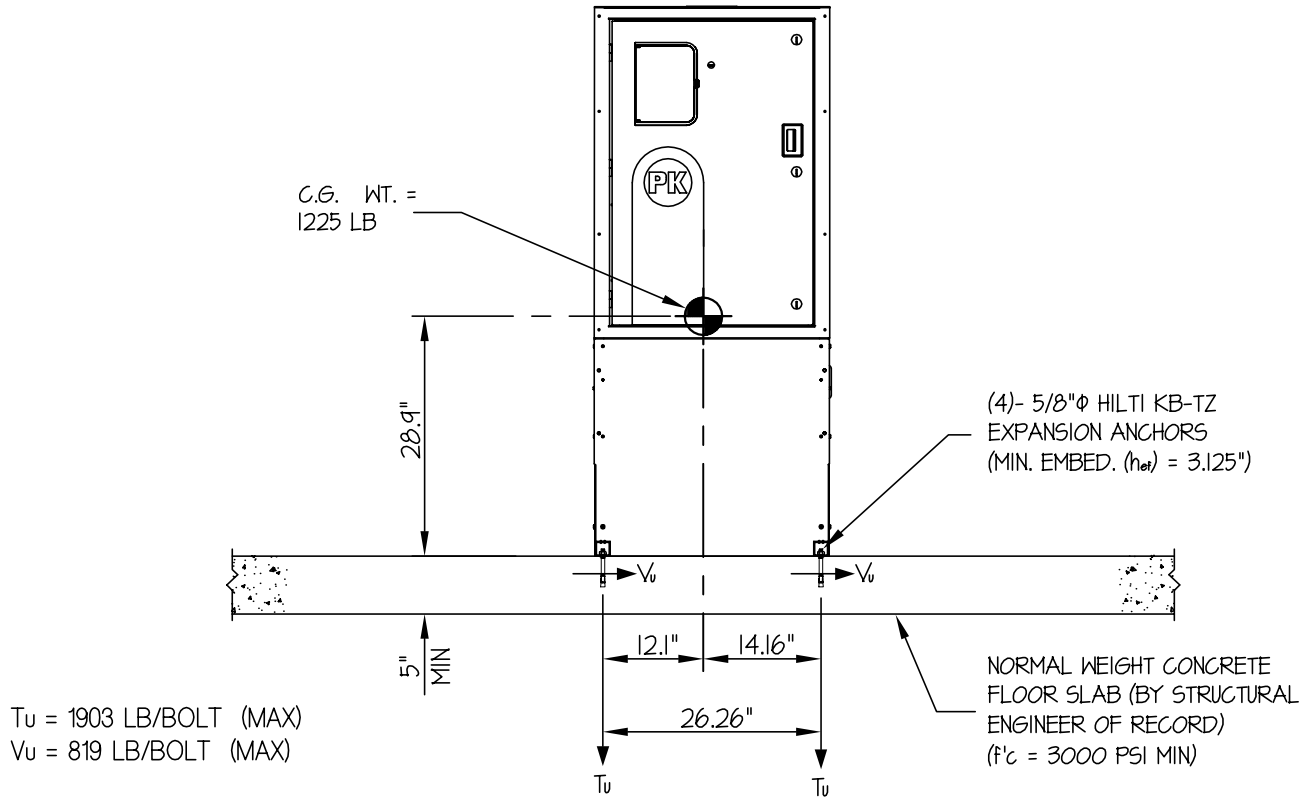
P-K MACH 'n' ROLL MnR1050

DES.	J. ROBERSON
JOB NO.	11-1535
DATE	12/4/15

SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE

SLAB ON GRADE



FRONT ELEVATION

NOTES:

1. **FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10**
   STRENGTH DESIGN IS USED. (S_{DS} = 2.20, a_p = 1.0, I_p = 1.5, R_p = 2.5, Ω_0 = 2.5, z/h = 0)

   HORIZONTAL FORCE (E_h) = 0.99 W_p
   HORIZONTAL FORCE (E_{mh}) = 2.48 W_p (FOR CONCRETE ANCHORAGE)
   VERTICAL FORCE (E_v) = 0.44 W_p

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.

3. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

REGISTERED PROFESSIONAL ENGINEER
JONATHAN ROBERSON
No. 4197
EXP. 6-30-2016
12/4/15
STRUCTURAL
STATE OF CALIFORNIA

NOT STRUCTURAL ENGINEER OF RECORD

PATTERSON-KELLEY CO.

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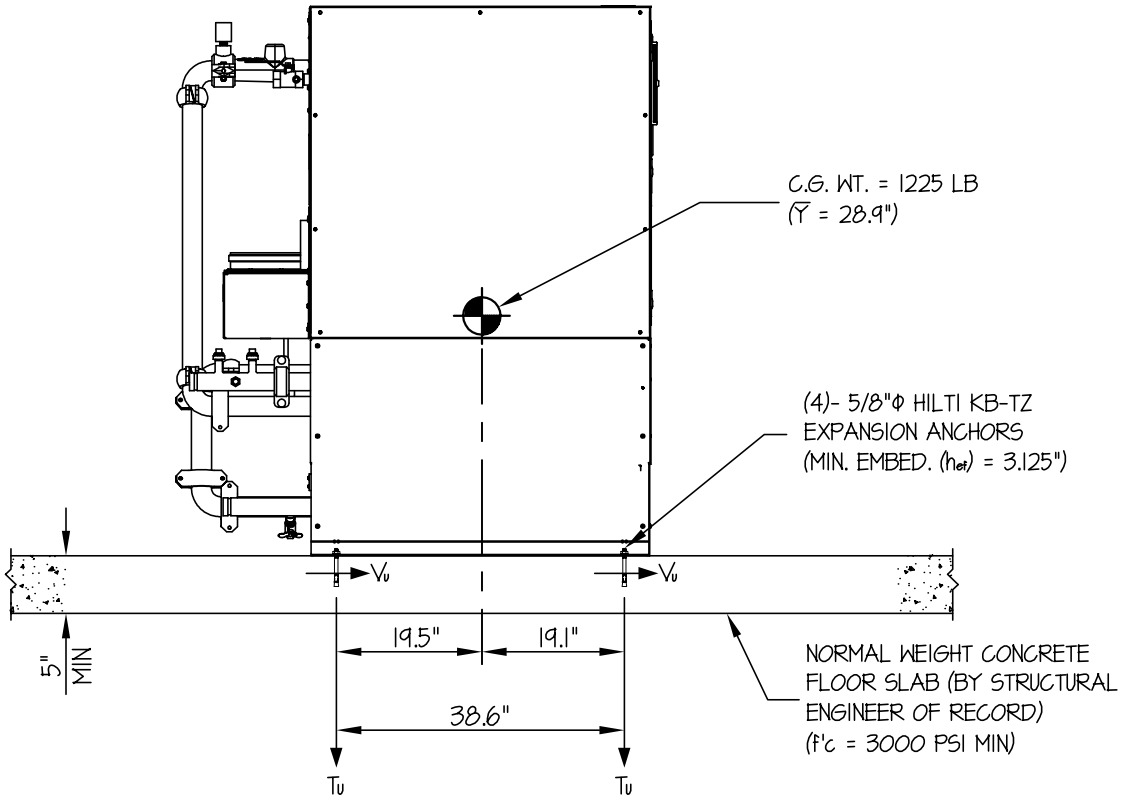
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE

SLAB ON GRADE



SIDE ELEVATION

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.
STRENGTH DESIGN IS USED (S_{DS} = 2.20, a_p = 1.0, I_p = 1.5, R_p = 2.5, Ω_o = 2.5, z/h = 0)

WEIGHT = 1225 LB

HORIZONTAL FORCE (E_{mh}) = 2.48 W_p = 3038 LB

VERTICAL FORCE (E_v) = 0.44 W_p = 539 LB

BOLT SPECS: 5/8"φ HILTI KB-TZ
ΦT= 0.75ΦNn = 2508 LB/BOLT (TENSION)
ΦV= ΦVn = 4940 LB/BOLT (SHEAR)

BOLT FORCES:

TENSION (T)

$$T_{u\ MAXIMUM} = \left[\frac{3038\#(28.9'')(14.16'')}{1\ BOLT\ (38.6'')(26.26'')} \times (0.3)\right] + \frac{3038\#(28.9'')(19.5'')}{1\ BOLT\ (26.26'')(38.6'')} - \frac{(1225\#(0.9) - 539\#)(14.16'')(19.5'')}{1\ BOLT\ (26.26'')(38.6'')} = 1903\ LB/BOLT\ (MAX)$$

(HORIZ. - FRONT TO BACK) (HORIZ. - SIDE TO SIDE) (WEIGHT(0.9) - E_v)

SHEAR (V)

$$V_{u\ MAXIMUM} = \frac{3038\#(14.16'')}{2\ BOLTS\ (26.26'')} = 819\ LB/BOLT\ (MAX)$$

UNITY CHECK:

$$\left(\frac{T_u}{\Phi T}\right) + \left(\frac{V_u}{\Phi V}\right) \leq 1.2 \qquad \left(\frac{1903}{2508}\right) + \left(\frac{819}{4940}\right) = 0.93 \leq 1.2 \quad \therefore \text{O.K.}$$

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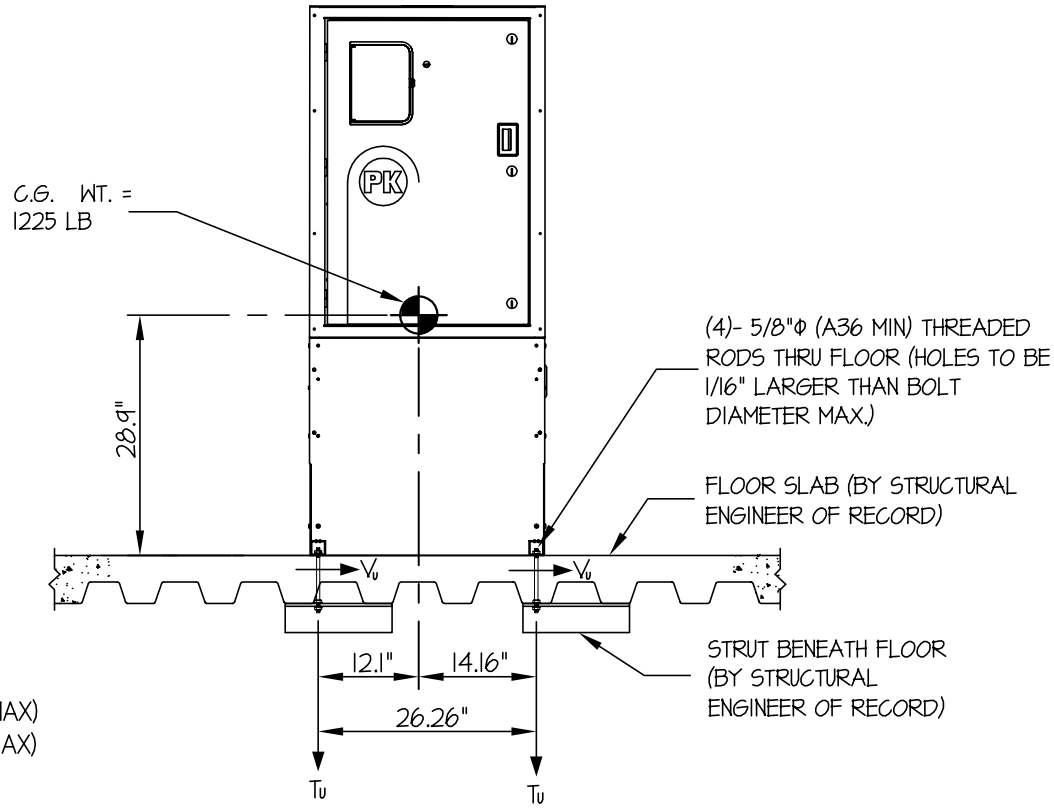
SHEET 1 OF 2 SHEETS

SEISMIC ANCHORAGE

UPPER FLOOR



Tu = 1157 LB/BOLT (MAX)
Vu = 522 LB/BOLT (MAX)

FRONT ELEVATION

NOTES:

1. **FORCES ARE DETERMINED PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.**
   STRENGTH DESIGN IS USED. (S_{DS} = 2.20, a_p = 1.0, I_p = 1.5, R_p = 2.5, $z/h \leq 1$)

   HORIZONTAL FORCE (E_h) = 1.58 W_p
   VERTICAL FORCE (E_v) = 0.44 W_p

2. CENTER OF GRAVITY (C.G.) AND WEIGHT ARE THE GOVERNING PARAMETERS FOR DESIGN. THESE CALCULATIONS ENCOMPASS ALL WEIGHTS UP TO THE MAXIMUM WEIGHT SHOWN.

3. STRUCTURAL ENGINEER OF RECORD FOR THE BUILDING SHALL PROVIDE SUPPORT STRUCTURE DESIGNED TO SUPPORT WEIGHTS AND FORCES SHOWN IN COMBINATION WITH ALL OTHER LOADS THAT MAY BE PRESENT.

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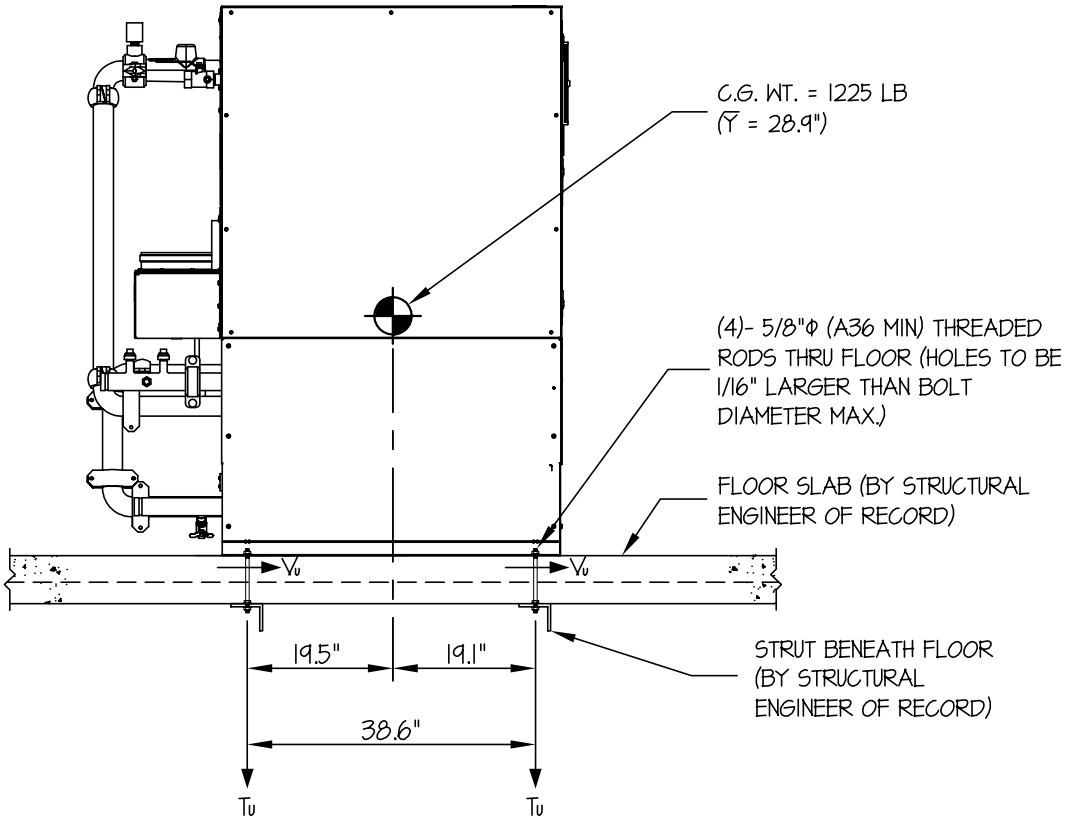
SHEET 2 OF 2 SHEETS

SEISMIC ANCHORAGE — UPPER FLOOR



SIDE ELEVATION

LOADS: PER 2013 CALIFORNIA BUILDING CODE AND ASCE 7-10.
STRENGTH DESIGN IS USED (S_{DS} = 2.20, a_p = 1.0, I_p = 1.5, R_p = 2.5, $z/h \leq 1$)
WEIGHT = 1225 LB
HORIZONTAL FORCE (E_h) = $1.58W_p$ = 1936 LB
VERTICAL FORCE (E_v) = $0.44W_p$ = 539 LB

BOLT SPECS: 5/8"ϕ (A36) THREADED ROD
ϕT= 10,016 LB/BOLT (TENSION)
ϕV= 5342 LB/BOLT (SHEAR)

BOLT FORCES:

TENSION (T)

$$T_{U\ MAXIMUM} = \left[\frac{1936\#(28.9'')(14.16'')}{1\ BOLT\ (38.6'')(26.26'')} \times (0.3)\right] + \frac{1936\#(28.9'')(19.5'')}{1\ BOLT\ (26.26'')(38.6'')} - \frac{(1225\#(0.9) - 539\#)(14.16'')(19.5'')}{1\ BOLT\ (26.26'')(38.6'')} = 1157\ LB/BOLT\ (MAX)$$

(HORIZ. - FRONT TO BACK) (HORIZ. - SIDE TO SIDE) (WEIGHT (0.9) - E_v)

SHEAR (V)

$$V_{U\ MAXIMUM} = \frac{1936\#(14.16'')}{2\ BOLTS\ (26.26'')} = 522\ LB/BOLT\ (MAX)$$